



# **general rolling bearings**

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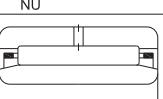
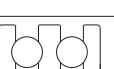
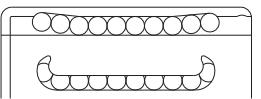
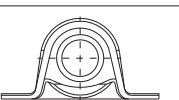
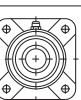
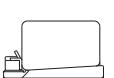
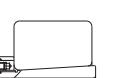
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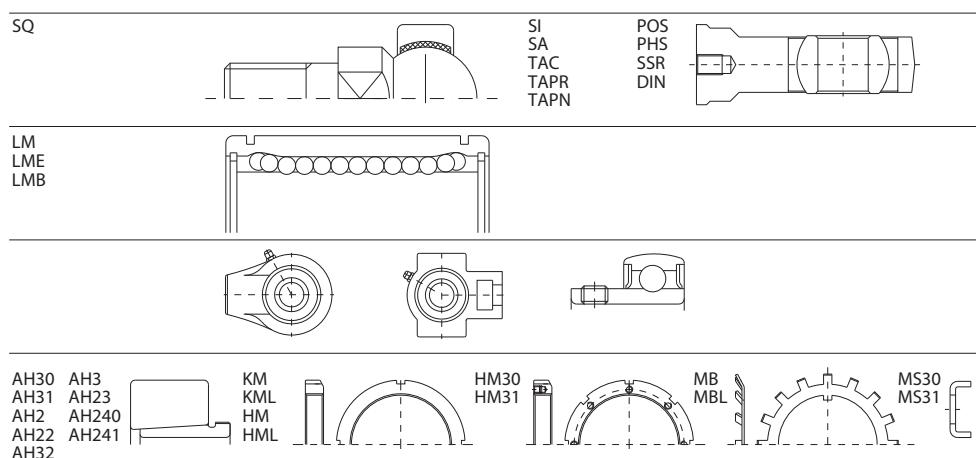
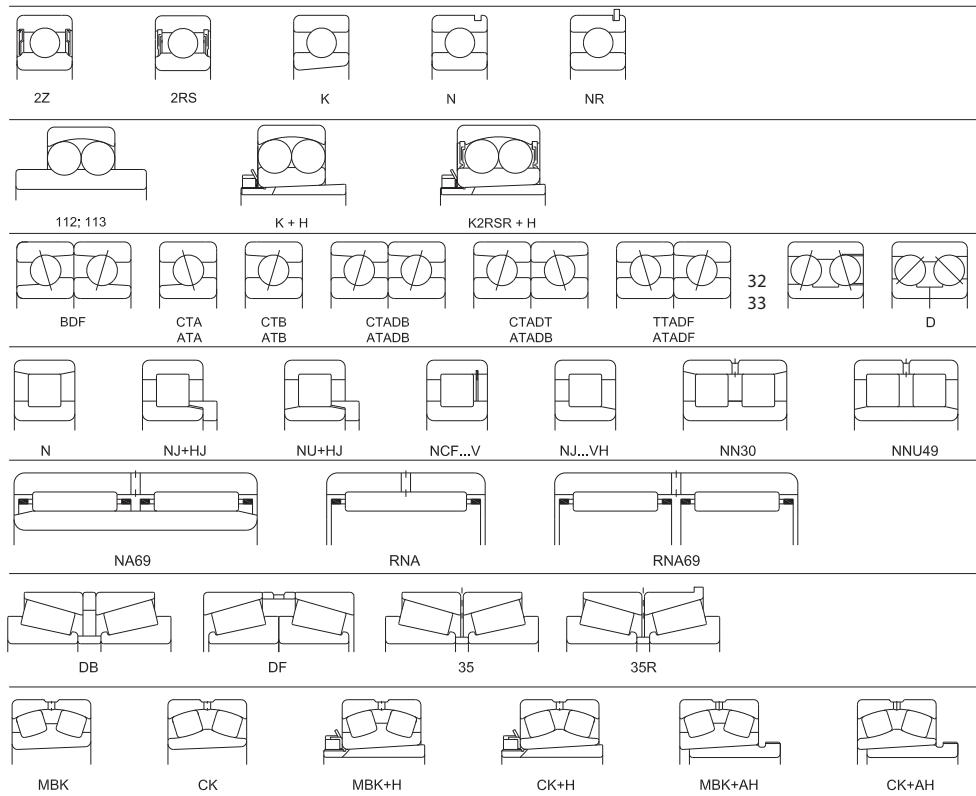
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## Measuring units of the international system SI

### Lenght

1 mm = 0,039 in  
1 in = 25,4 mm

### Mass

1 kg = 2,205 lb

### Force

1 kN = 1 000 N = 225 lbf  
1 kgf = 9,81 N  
1 lbf = 4,45 N

### Moment

1 N mm = 0,102 kgf mm  
1 kgf mm = 9,81 N mm  
1 N m = 8,85 in lbf  
1 in lbf = 0,113 N mm

### Pressure per unit of area (surface)

1 N/mm<sup>2</sup> = 1 MPa = 145 psi  
1 psi = 0,102 kgf/mm<sup>2</sup>  
1 kgf/mm<sup>2</sup> = 9,81 N/mm<sup>2</sup>

### Power

1 W = 1 J/s = 1 N m/s = 0,102 kgf m/s  
1 kW = 1,36 CP = 102 kgf m/s  
1 kgf m/s = 9,81 N m/s = 9,81 j/s

### Mechanical work

1 kgf m = 9,81 W s = 9,81 N m  
1 J (Joule) = 1 N m = 1 W s = 0,102 kgf m

### Kinematic viscosity

1 mm<sup>2</sup>/s = 1 cSt (centiStokes)

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# Selection of bearing type

Each type of bearing displays characteristics features which make it suitable for a certain application. Therefore, many bearings types and constructive versions have been developed so that they can satisfy various demands for rolling bearings. Taking into account the great number of factors to be considered when selecting a bearing type, no general rule can be given.

We give further the most important criteria to be considered when selecting the bearing type.

## Selection of bearing type, considering the load magnitude and direction

### Radial load

Deep groove ball bearings are the most suitable types of bearings for light and moderate pure radial loads. For heavy radial load and where large-diameter shafts are used, double row cylindrical roller bearings are the adequate choice. Needle roller bearings are recommended in case of limited space and heavy loads.

### Axial load

For pure axial loads, single direction thrust ball bearings are used in case of loads acting in one directions. For loads acting in both directions, double direction thrust ball bearings are used. Angular contact thrust ball bearing are and single or double row angular contact ball bearings are used in case of light or moderate pure axial loads at moderate speeds.

For light axial loads at high speeds, deep groove ball bearings are suitable. Under the axial load, a contact angle different from  $0^\circ$  is generated in these bearings and therefore they operate as angular contact ball bearings. In order to increase

axial load carrying capacity, a larger clearance should be selected (C3, C4, etc.)

For moderate axial loads at high speed, angular contact ball bearings in tandem arrangement are used so that they can take over loads acting in both directions.

Four-point contact ball bearings QJ type, are also used.

### Combined load

In order to carry combined radial and axial loads acting simultaneously, bearings with a contact angle different from  $0^\circ$  are used. The greater the contact angle, the greater the axial load carrying capacity.

Self-aligning ball bearings, spherical roller bearings or cylindrical roller bearings, NJ, NUP, NJ + HJ types, can also accommodate combined loads of certain values. But there are some limit values of the ratio  $F_a/F_r$ , which are shown in bearing tables and cannot be exceeded. Cylindrical roller bearings can carry axial loads by means of the sliding friction on ribs. For this reason, the load is limited according to the indications on page 208.

Bearings which accommodate only one direction axial loads should always be mounted in pairs so that they can carry axial loads in both directions.

## Selection of bearing type considering the alignment between shaft and housing

Angular misalignments occur generally when the shaft bends under the operating load or when bearings adjacent parts have form or position deviations.

In such cases, self-aligning ball bearings, cylindrical roller bearings or spherical roller thrust bearings should be used.

A certain bearing bent angle can compensate

for errors of alignment and maximum angle values are shown for each type in the introductory texts of the table sections.

When misalignments should be compensated, radial and axial clearance are important. The larger the clearance, the greater the possibility of self-aligning.

If the misalignment exceeds the permissible values shown in the introductory texts of the bearing tables, the bearing rating life decreases. The greater the ratio  $F_p/C_{0r}$ , the shorter the rating life. If  $0,1 < F_p/C_{0r} < 3$ , the rating life decreases with about 25%.

### **Selection of bearing type considering the operating temperature**

Bearings are generally used up to a temperature of maximum +120°C. In case of higher temperatures, bearings with special heat treatments should be used, in accordance with specifications on page 24.

Sealed bearings, 2RS type, should be used at operating temperatures up to 80°C. If this temperature is exceeded, the efficacy of lubricants is considerably reduced.

### **Selection of bearing internal clearance**

In most cases, while operating, bearings should have a small radial clearance that can be defined as "the possible value of displacement in radial direction of one bearing ring in relation to the other without parts deformations".

While operating, bearing internal clearance is different from the one at delivery, since the latter is reduced when mounting bearings with a certain tight fit.

Under operating conditions, internal clearance change is also caused by different temperatures between the outer and inner ring. Bearings are generally delivered with a normal radial or axial clearance according to the values shown for each rolling bearing group.

The decrease in radial clearance due to the tight fit and operating temperature is considered to be between 60-80% of the tightening value, depending on bearing series and size.

After the clearance in bearings has been decreased, a large enough operational clearance

should remain, so that the lubricant film shouldn't be destroyed.

Deep groove ball bearings should have an operational clearance close to zero. There may be often a light preload, due to the point-contact between the rolling elements and raceways.

Small-sized cylindrical roller and needle roller bearings should have an operational clearance of 5-10 µm and larger-sized bearings a clearance of 10-30 µm.

Bearing producers can also manufacture - at request - bearings with radial and axial clearance smaller (C1 and C2) or larger (C3, C4 and C5) than normal, so that the most favorable operating conditions for bearings should be assured.

Cylindrical and needle roller bearings can be manufactured with interchangeable rings (suffix NA).

Bearings with non interchangeable parts have a smaller radial clearance than bearings with interchangeable parts. Changing rings from one bearing to another not allowed.

In case of bearings with interchangeable parts, the rings may be changed and the values of radial clearance will not be altered.

### **Bearing types and technical characteristics**

URB bearing producers can be manufacture bearings of various type and size so that they can meet the customers' requirements assuring a proper reliability for various applications.

Table 1.1 shows quantitative results of each group of bearings, considering the main technical characteristics.

Bearing type is selected depending on the technical characteristics required by a certain application.

A suggestive graphic symbol has been determined for each main technical characteristic. Thus, a proper bearing for each purpose can be easily chosen. According to the specifications in this catalogue, the proper type and size of bearing can be selected, together with all manufacturing and operating technical conditions.

## Bearing types and their characteristics

		- excellent	- poor	Purely radial load	Purely axial load	Combined load	Moment load
		- good	- unsuitable				
		- fair	→ - single direction ↔ - double direction				
Deep groove ball bearings							
Self-aligning ball bearings							
Angular contact ball bearings - single row	a						
	b						
Cylindrical roller bearings - NU; N							
- NJ, NU+HJ, NUP, NJ+HJ							
- NCF, NJ23VH							
- NNU, NN							
Needle roller bearings - NA							
Spherical roller bearings							
Tapered roller bearings - single row							
Thrust ball bearing - single direction - double direction	a						
	b						

Table 1.1

# Selection of bearing size

The size of a bearing is selected considering the load in the used rolling bearing and also depends on the operational rating life and prescribed operating safety.

## Basic load ratings

The basic dynamic load rating  $C_r$  is used to calculate bearing dimensions while rotating under load. It expresses the bearing permissible load which will give a basic rating life up to 1000 000 revolutions.

The basic dynamic load ratings of URB bearings have been determined in accordance with international standard ISO 281. The values are given in bearing tables.

Considering the basic dynamic load rating, the service time until the fatigue of the material appears is calculated, determining this way the calculated rating life.

Basic static load rating  $C_0$  is considered in case of low speeds, low oscillating movements or in the stationary case.

The basic static load rating is defined in accordance with ISO 76, as the load acting upon the stationary bearing. It corresponds to a calculated contact stress in the center of the contact area between the most heavily loaded rolling element and the raceway, of:

- 4 600 MPa for self-aligning ball bearings,
- 4 200 MPa for all other ball bearings,
- 4 000 MPa for all roller bearings.

This stress produces a permanent deformations of the rolling element and raceway which is about 0,0001 of the rolling element diameter. The loads are pure radial for radial bearings and pure axial for thrust bearings.

## Bearing life

The life of a rolling bearings is defined as the number of revolutions of the number of operating hours, which the bearings is capable to endure, before the first sign of fatigue occurs on one of its rings, on the raceway or the rolling elements.

If we want to consider only the fatigue on the bearing operating surfaces the following conditions have to be observed:

1. The forces and speeds considered when calculating the bearing should correspond to the real operating conditions.
2. Proper lubrication should be assured during the entire operating period.
3. If the bearing carries a light load, its failure is generated by the wear.
4. Experience showed that the failure of many bearings was caused by other reasons than fatigue, such as: selection of an inadequate bearing type in a bearing joint, improper operation or lubrication, outer particles in bearing etc.

## Basic rating life

The basic rating life of a single bearing or a group of apparently identical bearings operating under identical conditions, is the life corresponding to a reliability of 90%.

The average life of a group of bearings is approximately five times longer than the basic rating life.

Basic rating life is marked with  $L_{10}$  (millions of revolutions) or  $L_{10h}$  (operating hours).

$L_{10}$  can be calculated using the equation:

$$L_{10} = \left( \frac{C}{P} \right)^{\alpha}, \text{ where:}$$

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$L_{10}$	- basic rating life, millions of revolutions,
C	- basic bearing load, kN,
P	- equivalent dynamic bearing load, kN,
p	- exponent of the life equation with the following values: $p=3$ - for ball bearings $p = 10/3$ - for roller bearings

The equivalent dynamic bearing load, respectively the radial and axial load, acting simultaneously can be calculated using the following equations (applicable to ball and roller radial bearings):

$$P_r = F_r, \text{ kN,} \quad \text{- for pure radial load}$$

$$P_r = XF_r + YF_a, \text{ kN,} \quad \text{- for combined load}$$

For thrust ball bearings, the following equations can be used:

$$P_a = F_a, \text{ kN,} \quad \text{- for pure axial load}$$

$$P_a = XF_r + YF_a, \text{ kN,} \quad \text{- for combined load}$$

where:

$F_r$  = the radial component of the load, kN  
 $F_a$  = the axial component of the load, kN

In the texts preceding the bearing tables, for some groups of bearings there are given details for determining the equivalent load. Values of the coefficients X and Y can be found in tables.

For bearings operating at constant speed, the basic rating life expressed in operating hours can be calculated using the equation:

$$L_{10h} = \frac{1000000}{60n} (C/P)^p \quad \text{or} \quad L_{10h} = \frac{16666}{n} (C/P)^p$$

where:

n = rotational speed, r/min

Values of the basic rating life  $L_{10}$  (millions of revolutions) as a function of the ratio C/P can be found in the table 2.1.

Values of the basic rating life  $L_{10h}$  (operating hours) as a function of the ratio C/P and speed n can be found in table 2.2 for ball bearings and table 2.3 for roller bearings.

When determining the bearing size it is necessary to base the calculations on the rating life corresponding to the purpose of operation.

It usually depends on the machine type, service life and the requirements regarding operational safety.

Approximate values of the service life for various classes of machines and equipments for general purposes are given in table 2.4

The basic rating life  $L_{10h}$  of the bearings can be determined as a function of service life, using the life calculation chart on page 18

The basic rating life of road and rail vehicle bearings, for wheel - axle bearing, is expressed as a function of the wheel diameter and covered distance (km), using the equation:

$$L_{10h} = \frac{\pi D}{1000} L_{10s}, \text{ respectively: } L_{10s} = \frac{\pi D}{1000} L_{10}$$

where:

$L_{10}$	- basic rating life, millions of revolutions
$L_{10s}$	- service life distance, millions of kilometers
D	- wheel diameter, m

Approximate values for the service life distance (kilometers covered), in case of light loaded cars and rail vehicles are given in table 2.5.

**Load ratio C/P for various life values L<sub>10</sub>**  
**(millions of revolutions)**

Table 2.1

L <sub>10</sub>	C/P Ball bearings	Roller bearings	L <sub>10</sub>	C/P Ball bearings	Roller bearings	L <sub>10</sub>	C/P Ball bearings	Roller bearings
<b>0,5</b>	0,793	0,812	<b>240</b>	6,21	5,18	<b>2000</b>	12,6	9,78
<b>0,75</b>	0,909	0,917	<b>260</b>	6,38	5,3	<b>2200</b>	13	10,1
<b>1</b>	1	1	<b>280</b>	6,54	5,42	<b>2400</b>	13,4	10,3
<b>1,5</b>	1,14	1,13	<b>300</b>	6,69	5,54	<b>2600</b>	13,8	10,6
<b>2</b>	1,26	1,24	<b>320</b>	6,84	5,64	<b>2800</b>	14,1	10,8
<b>3</b>	1,44	1,39	<b>340</b>	6,98	5,75	<b>3000</b>	14,4	11
<b>4</b>	1,59	1,52	<b>360</b>	7,11	5,85	<b>3200</b>	14,7	11,3
<b>5</b>	1,71	1,62	<b>380</b>	7,24	5,94	<b>3400</b>	15	11,5
<b>6</b>	1,82	1,71	<b>400</b>	7,37	6,03	<b>3600</b>	15,3	11,7
<b>8</b>	2	1,87	<b>420</b>	7,49	6,12	<b>3800</b>	15,6	11,9
<b>10</b>	2,15	2	<b>440</b>	7,61	6,21	<b>4000</b>	15,9	12
<b>12</b>	2,29	2,11	<b>460</b>	7,72	6,29	<b>4500</b>	16,5	12,5
<b>14</b>	2,41	2,21	<b>480</b>	7,83	6,37	<b>5000</b>	17,1	12,9
<b>16</b>	2,52	2,3	<b>500</b>	7,94	6,45	<b>5500</b>	17,7	13,2
<b>18</b>	2,62	2,38	<b>550</b>	8,19	6,64	<b>6000</b>	18,2	13,6
<b>20</b>	2,71	2,46	<b>600</b>	8,43	6,81	<b>6500</b>	18,7	13,9
<b>25</b>	2,92	2,63	<b>650</b>	8,66	6,98	<b>7000</b>	19,1	14,2
<b>30</b>	3,11	2,77	<b>700</b>	8,88	7,14	<b>7500</b>	19,6	14,5
<b>35</b>	3,27	2,91	<b>750</b>	9,09	7,29	<b>8000</b>	20	14,8
<b>40</b>	3,42	3,02	<b>800</b>	9,28	7,43	<b>8500</b>	20,4	15,1
<b>45</b>	3,56	3,13	<b>850</b>	9,47	7,56	<b>9000</b>	20,8	15,4
<b>50</b>	3,68	3,23	<b>900</b>	9,65	7,7	<b>9500</b>	21,2	15,6
<b>60</b>	3,91	3,42	<b>950</b>	9,83	7,82	<b>10000</b>	21,5	15,8
<b>70</b>	4,12	3,58	<b>1000</b>	10	7,94	<b>12000</b>	22,9	16,7
<b>80</b>	4,31	3,72	<b>1100</b>	10,3	8,17	<b>14000</b>	24,1	17,5
<b>90</b>	4,48	3,86	<b>1200</b>	10,6	8,39	<b>16000</b>	25,2	18,2
<b>100</b>	4,64	3,98	<b>1300</b>	10,9	8,59	<b>18000</b>	26,2	18,9
<b>120</b>	4,93	4,2	<b>1400</b>	11,2	8,79	<b>20000</b>	27,1	1,5
<b>140</b>	5,19	4,4	<b>1500</b>	11,4	8,97	<b>25000</b>	29,2	20,9
<b>160</b>	5,43	4,58	<b>1600</b>	11,7	9,15	<b>30000</b>	31,1	22
<b>180</b>	5,65	4,75	<b>1700</b>	11,9	9,31			
<b>200</b>	5,85	4,9	<b>1800</b>	12,2	9,48			
<b>220</b>	6,04	5,04	<b>1900</b>	12,4	9,63			

**Ball bearings - load ratio C/P for various basic rating lives  $L_{10h}$  (operating hours)  
at various speeds n (r/min)**

Table 2.2

$L_{10h}$	C/P when n =										
	50	100	150	200	250	300	400	500	750	1000	1500
<b>100</b>	0,67	0,84	0,97	1,06	1,14	1,22	1,34	1,44	1,65	1,82	2,08
<b>500</b>	1,14	1,44	1,65	1,82	1,96	2,08	2,29	2,47	2,82	3,11	3,56
<b>1000</b>	1,44	1,82	2,08	2,29	2,47	2,62	2,88	3,11	3,56	3,91	4,48
<b>1250</b>	1,55	1,96	2,24	2,47	2,66	2,82	3,11	3,35	3,83	4,22	4,83
<b>1600</b>	1,69	2,13	2,43	2,68	2,88	3,07	3,37	3,63	4,16	4,58	5,24
<b>2000</b>	1,82	2,29	2,62	2,88	3,11	3,30	3,63	3,91	4,48	4,93	5,65
<b>2500</b>	1,96	2,47	2,82	3,11	3,35	3,56	3,91	4,22	4,83	5,31	6,08
<b>3200</b>	2,13	2,68	3,07	3,37	3,63	3,86	4,25	4,58	5,24	5,77	6,60
<b>4000</b>	2,29	2,88	3,30	3,63	3,91	4,16	4,58	4,93	5,65	6,21	7,11
<b>5000</b>	2,47	3,11	3,56	3,91	4,22	4,48	4,93	5,31	6,08	6,69	7,66
<b>6300</b>	2,66	3,36	3,84	4,23	4,55	4,84	5,33	5,74	6,57	7,23	8,28
<b>8000</b>	2,88	3,63	4,16	4,58	4,93	5,24	5,77	6,21	7,11	7,83	8,96
<b>10000</b>	3,11	3,91	4,48	4,93	5,31	5,65	6,21	6,69	7,66	8,43	9,65
<b>12500</b>	3,35	4,22	4,83	5,31	5,27	6,08	6,69	7,21	8,25	9,09	10,4
<b>16000</b>	3,63	4,58	5,24	5,77	6,21	6,60	7,27	7,83	8,96	9,86	11,3
<b>20000</b>	3,91	4,93	5,65	6,21	6,69	7,11	7,83	8,43	9,65	10,6	12,2
<b>25000</b>	4,22	5,31	6,08	6,69	7,21	7,66	8,43	9,09	10,4	11,4	13,1
<b>32000</b>	4,58	5,77	6,60	7,27	7,83	8,32	9,16	9,86	11,3	12,4	14,2
<b>40000</b>	4,93	6,21	7,11	7,83	8,43	8,96	9,86	10,6	12,2	13,4	15,3
<b>50000</b>	5,31	6,69	7,66	8,43	9,09	9,65	10,6	11,4	13,1	14,4	16,5
<b>63000</b>	5,74	7,23	8,28	9,11	9,81	10,4	11,5	12,4	14,2	15,6	17,8
<b>80000</b>	6,21	7,83	8,96	9,86	10,6	11,3	12,4	13,4	15,3	16,9	19,3
<b>100000</b>	6,69	8,43	9,65	10,6	11,4	12,2	13,4	14,4	16,5	18,2	20,8
<b>200000</b>	8,43	10,6	12,2	13,4	14,4	15,3	16,9	18,2	20,8	22,9	26,2

$L_{10h}$	C/P when n =										
	2000	2500	3000	4000	5000	6000	8000	10000	15000	20000	30000
<b>100</b>	2,29	2,47	2,62	2,88	3,11	3,30	3,63	3,91	4,48	4,93	5,65
<b>500</b>	3,91	4,22	4,48	4,93	5,31	5,65	6,21	6,69	7,66	8,43	9,65
<b>1000</b>	4,93	5,31	5,65	6,21	6,69	7,11	7,83	8,43	9,65	10,6	12,2
<b>1250</b>	5,31	5,72	6,08	6,69	7,21	7,66	8,43	9,09	10,4	11,4	13,1
<b>1600</b>	5,77	6,21	6,60	7,27	7,83	8,32	9,16	9,86	11,3	12,4	14,2
<b>2000</b>	6,21	6,69	7,11	7,83	8,43	8,96	9,86	10,6	12,2	13,4	15,3
<b>2500</b>	6,69	7,21	7,66	8,43	9,09	9,65	10,6	11,4	13,1	14,4	16,5
<b>3200</b>	7,27	7,83	8,32	9,16	9,86	10,5	11,5	12,4	14,2	15,7	17,9
<b>4000</b>	7,83	8,43	8,96	9,86	10,6	11,3	12,4	13,4	15,3	16,9	19,3
<b>5000</b>	8,43	9,09	9,65	10,6	11,4	12,2	13,4	14,4	16,5	18,2	20,8
<b>6300</b>	9,11	9,81	10,4	11,5	12,4	13,1	14,5	15,6	17,8	19,6	22,5
<b>8000</b>	9,86	10,6	11,3	12,4	13,4	14,2	15,7	16,9	19,3	21,3	24,3
<b>10000</b>	10,6	11,4	12,2	13,4	14,4	15,3	16,9	18,2	20,8	22,9	26,2
<b>12500</b>	11,4	12,3	13,1	14,4	15,5	16,5	18,2	19,6	22,4	24,7	28,2
<b>16000</b>	12,4	13,4	14,2	15,7	16,9	17,9	19,7	21,3	24,3	26,8	30,7
<b>20000</b>	13,4	14,4	15,3	16,9	18,2	19,3	21,3	22,9	26,2	28,8	33,0
<b>25000</b>	14,4	15,5	16,5	18,2	19,6	20,8	22,9	24,7	28,2	31,1	35,6
<b>32000</b>	15,7	16,9	17,9	19,7	21,3	22,6	24,9	26,8	30,7	33,7	38,6
<b>40000</b>	16,9	18,2	19,3	21,3	22,9	24,3	26,8	28,8	33,0	36,3	41,6
<b>50000</b>	18,2	19,6	20,8	22,9	24,7	26,1	28,8	31,1	35,6	39,1	44,8
<b>63000</b>	19,6	21,1	22,5	24,7	26,6	28,3	31,2	33,6	38,4	42,3	48,4
<b>80000</b>	21,3	22,9	24,3	26,8	28,8	30,7	33,7	36,3	41,6	45,8	52,4
<b>100000</b>	22,9	24,7	26,2	28,8	31,1	33,0	36,3	39,1	44,8	49,3	56,5
<b>200000</b>	28,8	31,1	33,0	36,3	39,1	41,6	45,8	49,3	56,5	62,1	71,1

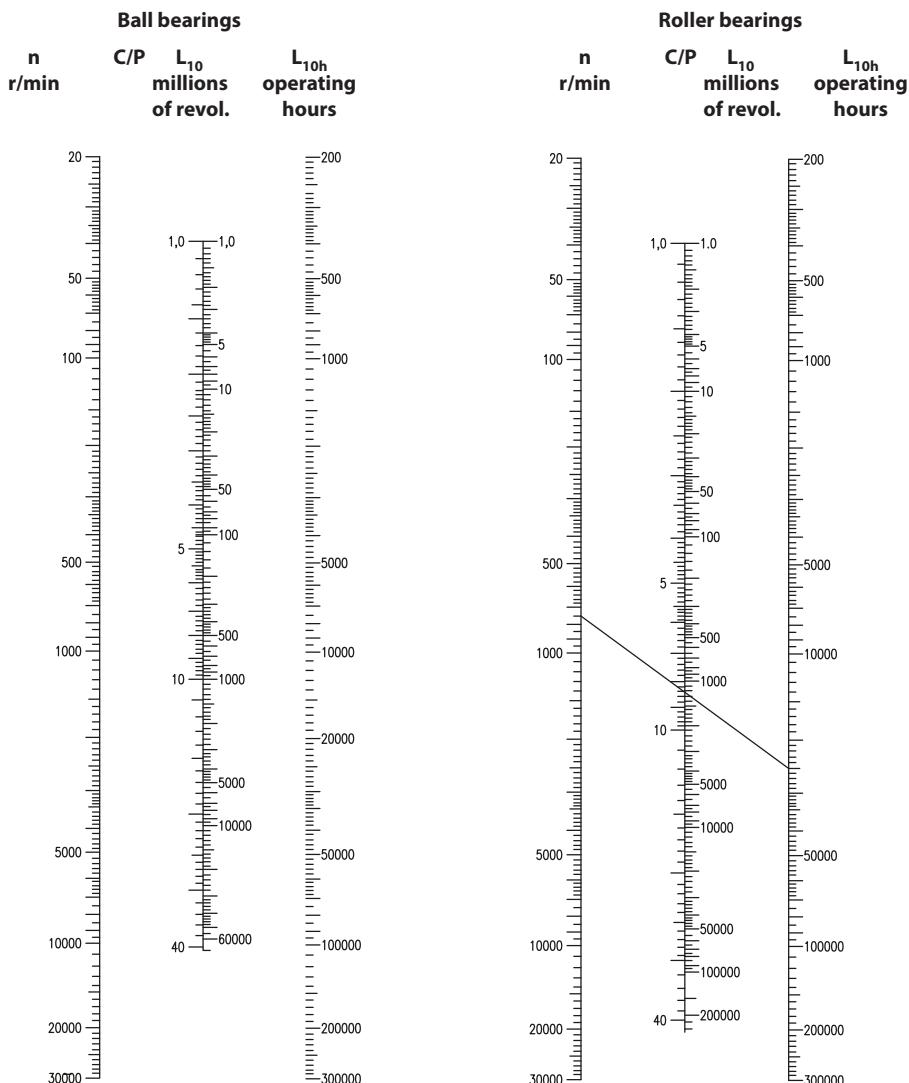
**Roller bearings - load ratio C/P for various basic rating lives  $L_{10h}$  (operating hours)  
at various speeds n (r/min)**

Table 2.3

$L_{10h}$	C/P when n =										
	50	100	150	200	250	300	400	500	750	1000	1500
<b>100</b>	0,70	0,86	0,97	1,06	1,13	1,19	1,30	1,39	1,57	1,71	1,93
<b>500</b>	1,13	1,39	1,57	1,71	1,83	1,93	2,11	2,25	2,42	2,77	3,13
<b>1000</b>	1,39	1,71	1,93	2,11	2,25	2,38	2,59	2,77	3,13	3,42	3,86
<b>1250</b>	1,49	1,83	2,07	2,25	2,41	2,54	2,77	2,97	3,35	3,65	4,12
<b>1600</b>	1,60	1,97	2,23	2,43	2,59	2,74	2,99	3,19	3,61	3,93	4,44
<b>2000</b>	1,71	2,11	2,38	2,59	2,77	2,93	3,19	3,42	3,86	4,20	4,75
<b>2500</b>	1,83	2,25	2,54	2,77	2,97	3,13	3,42	3,65	4,12	4,50	5,08
<b>3200</b>	1,97	2,43	2,74	2,99	3,19	3,37	3,68	3,93	4,44	4,84	5,47
<b>4000</b>	2,11	2,59	2,93	3,19	3,42	3,61	3,93	4,20	4,75	5,18	5,85
<b>5000</b>	2,25	2,77	3,13	3,42	3,65	3,86	4,20	4,50	5,08	5,54	6,25
<b>6300</b>	2,42	2,97	3,36	3,66	3,91	4,13	4,51	4,82	5,44	5,93	6,70
<b>8000</b>	2,59	3,19	3,61	3,93	4,20	4,44	4,84	5,18	5,85	6,37	7,20
<b>10000</b>	2,77	3,42	3,86	4,20	4,50	4,75	5,18	5,54	6,25	6,81	7,70
<b>12500</b>	2,97	3,65	4,12	4,50	4,81	5,08	5,54	5,92	6,68	7,29	8,23
<b>16000</b>	3,19	3,93	4,44	4,84	5,18	5,47	5,96	6,37	7,20	7,85	8,86
<b>20000</b>	3,42	4,20	4,75	5,18	5,54	5,85	6,37	6,81	7,70	8,39	9,48
<b>25000</b>	3,65	4,50	5,08	5,54	5,92	6,25	6,81	7,29	8,23	8,97	10,1
<b>32000</b>	3,93	4,84	5,47	5,96	6,37	6,73	7,34	7,85	8,86	9,66	10,9
<b>40000</b>	4,20	5,18	5,85	6,37	6,81	7,20	7,85	8,39	9,48	10,3	11,7
<b>50000</b>	4,50	5,54	6,25	6,81	7,29	7,70	8,39	8,97	10,1	11,0	12,5
<b>63000</b>	4,82	5,93	6,70	7,30	7,81	8,25	8,99	9,61	10,9	11,8	13,4
<b>80000</b>	5,18	6,37	7,20	7,85	8,39	8,86	9,66	10,3	11,7	12,7	14,4
<b>100000</b>	5,54	6,81	7,70	8,39	9,48	10,3	11,0	12,5	13,6	15,4	17,7
<b>200000</b>	6,81	8,39	9,48	10,3	11,0	11,7	12,7	13,6	15,4	16,7	18,9

$L_{10h}$	C/P when n =										
	2000	2500	3000	4000	5000	6000	8000	10000	15000	20000	30000
<b>100</b>	2,11	2,25	2,38	2,59	2,77	2,93	3,19	3,42	3,86	4,20	4,75
<b>500</b>	3,42	3,65	3,86	4,20	4,50	4,75	5,18	5,54	6,25	6,81	7,70
<b>1000</b>	4,20	4,50	4,75	5,18	5,54	5,85	6,37	6,81	7,70	8,39	9,48
<b>1250</b>	4,50	4,81	5,08	5,54	5,92	6,25	6,81	7,29	8,23	8,97	10,1
<b>1600</b>	4,84	5,18	5,47	5,96	6,37	6,73	7,34	7,85	8,86	9,66	10,9
<b>2000</b>	5,18	5,54	5,85	6,37	6,81	7,20	7,85	8,39	9,48	10,3	11,7
<b>2500</b>	5,54	5,92	6,25	6,81	7,29	7,70	8,39	8,97	10,1	11,0	12,5
<b>3200</b>	5,96	6,37	6,73	7,34	7,85	8,29	9,03	9,66	10,9	11,9	13,4
<b>4000</b>	6,37	6,81	7,20	7,85	8,39	8,86	9,66	10,3	11,7	12,7	14,4
<b>5000</b>	6,81	7,29	7,70	8,39	8,97	9,48	10,3	11,0	12,5	13,6	15,4
<b>6300</b>	7,30	7,81	8,25	8,99	9,61	10,2	11,1	11,8	13,4	14,6	16,5
<b>8000</b>	7,85	8,39	8,86	9,66	10,3	10,9	11,9	12,7	14,4	15,7	17,7
<b>10000</b>	8,39	8,97	9,48	10,3	11,0	11,7	12,7	13,6	15,4	16,7	18,9
<b>12500</b>	8,97	9,59	10,1	11,0	11,8	12,5	13,6	14,5	16,4	17,9	20,2
<b>16000</b>	9,66	10,3	10,9	11,9	12,7	13,4	14,6	15,7	17,7	19,3	21,8
<b>20000</b>	10,3	11,0	11,7	12,7	13,6	14,4	15,7	16,7	18,9	20,6	23,3
<b>25000</b>	11,0	11,8	12,5	13,6	14,5	15,4	16,7	17,9	20,2	22,0	24,9
<b>32000</b>	11,9	12,7	13,4	14,6	15,7	16,5	18,0	19,3	21,8	23,7	26,8
<b>40000</b>	12,7	13,6	14,4	15,7	16,7	17,7	19,3	20,6	23,3	25,4	28,7
<b>50000</b>	13,6	14,5	15,4	16,7	17,9	18,9	20,6	22,0	24,9	27,1	30,6
<b>63000</b>	14,6	15,6	16,5	17,9	19,2	20,3	22,1	23,6	26,7	29,1	32,8
<b>80000</b>	15,7	16,7	17,7	19,3	20,6	21,8	23,7	25,4	28,7	31,2	35,3
<b>100000</b>	16,7	17,9	18,9	20,6	22,0	23,3	25,4	27,1	30,6	33,4	37,7
<b>200000</b>	20,6	22,0	23,3	25,4	27,1	28,7	31,2	33,4	37,7	41,1	46,4

**Basic rating life calculation chart**



**Example:**

1. It is required to determine the size of a deep groove ball bearing single row, considering the following conditions:

- Basic rating life  $L_{10h} = 25000$  operating hours
- Rotational speed  $n = 1000$  r/min
- Load in bearing  $F_r = 5$  kN

The chart shows that  $C/P = 11,6$ ;  $C = 11,6 \times 5 = 58$  kN. In the catalogue on page 101, you can select the bearing 6310 type with the following characteristics:  $C_r = 61,8$ kN;  $n = 7000$  r/min.

2. What is the basic rating life of the bearing NU 210E which is operating under a radial load of 7,7 kN at rotational speed  $n = 750$  r/min?

See page 220 in the catalogue and you will find for the bearing, NU 210E type, the following values:  $C_r = 63,7$  kN,  $n = 8000$  r/min. From the chart, for a bearing operated at a rotational speed of 750 r/min and  $C_r/P_r = 63,7/7,7 = 8,3$ , a basic rating life  $L_{10h} = 25000$ .

### Recommended basic rating lives for general purpose machines

Table 2.4

Application	Recommended basic rating life $L_{10h}$ (operating hours)
Household machines, technical apparatus for medical use, instruments, agricultural machines:	300...3000
Machines used for short periods or intermittently: electric hand tools, cranes, lifting tackles in workshops, building machines:	3000...8000
Machines used intermittently or for short periods with high operational reliability: lifts, small cranes:	8000...12000
Machines for use 8 hours/day but not always at full capacity: machines for general purposes, electric motors for industrial use, rotary crushes, gear drives for general purposes:	10000...25000
Machines operating 8 hours/day at full capacity: machine tools, woodworking machines, large cranes, printing equipment, ventilators, separators, centrifuges:	20000...30000
Machines for continuous use 24 hours/day: Rolling mill gear units, medium sized electrical machinery, compressors, pumps, textile machines, mine hoists:	40000-50000
Hydraulic machines, rotary furnaces, capstans, propulsion machinery for sea vessel (propellers for seat vessels):	50000...100000
Machines for continuous use 24 hour/day with high reliability: large electric machinery, mine pumps and mine ventilators, power station plants, machines for cellulose industry, pumping units:	100000...

### Values for basic rating life $L_{10s}$

Table 2.5

Type of vehicle	$L_{10s}/10^6$
km	
Wheel hub bearings for road vehicles	
- light loaded cars	0,3
- trucks, buses	0,6
Axlebox bearings for rail vehicles:	
- goods wagons (according to UIC)	0,8
- suburban vehicles, trams	1,5
- long distance passenger carriages	3
- motorailers	3-4
- Diesel and electric locs	

$\gamma$  - oscillation amplitude (angle of maximum deviation from center position), degrees.

If the amplitude of oscillation is very small, it can be ignored for basic rating life determination.

### Fluctuating dynamic load and speeds

In many cases, in operation speed and magnitude of load fluctuate. Therefore a mean dynamic load is to be calculated.

Complete oscillation =  $4\gamma$  from point 0 to point 4

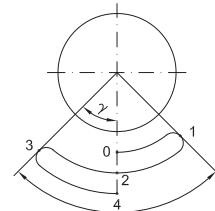


Fig. 1

The load acting on the bearing can vary as

URB

In case of bearings which do not rotate but oscillate from a central position through an angle, as shown in fig. 1, basic rating life can be determined as follows:

$$L_{10sc} = \frac{180}{2\gamma} L_{10}, \text{ where:}$$

$L_{10sc}$  - bearing rating life, millions of cycles

shown in fig. 2-a and 2-b.

In this case, the mean load can be determined using the equation:

$$F_m = \sqrt[p]{\frac{F_1^p n_1 + F_2^p n_2 + \dots + F_n^p n_n}{n}},$$

where:

- $F_m$  - constant mean load, kN
- $F_1, F_2, \dots F_n$  - constant load during  $n_1, n_2, \dots n_n$  revolutions, kN
- $n$  - total number of revolutions ( $n=n_1+n_2+\dots$ ) during which loads  $F_1, F_2, \dots$  act
- $p$  - exponent- 3 - for ball bearings,  
-10/3 - for roller bearings.

If the bearing speed is constant and the magnitude of the load is between the minimum value  $F_{min}$  and a maximum value  $F_{max}$  as shown in fig. 3a and b, the mean load can be obtained from:

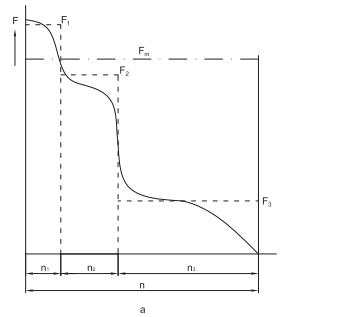


Fig. 2

$$F_m = \frac{F_{min} + 2F_{max}}{3}, \text{ kN}$$

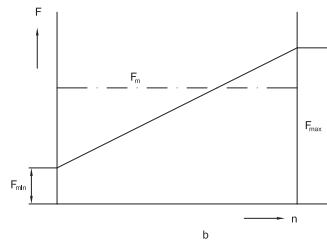
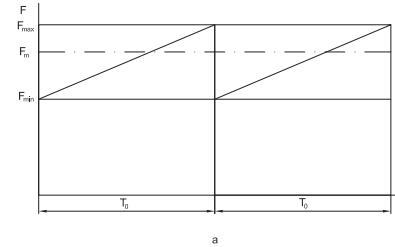


Fig. 3

If the external radial load consists of a load  $F_1$  which is constant in magnitude and direction and a load  $F_2$  which is variable in direction and constant in magnitude ( $F_1$  and  $F_2$  acting in the same plane) as shown in fig. 4, the mean load can be determined using the equation:

$$F_m = f_m (F_1 + F_2), \text{ kN}$$

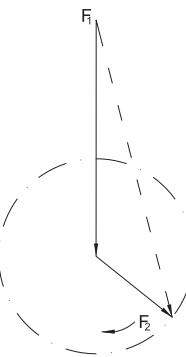


Fig. 4

Values for the factor  $f_m$  can be obtained from fig. 5.

In case of sinusoidal movement as it is shown in fig 6, the mean load can be obtained from:

$$F_m = \sqrt{\frac{4}{3\pi}} F_{max}, \text{ kN}$$

$F_m \approx 0,75 F_{max}$ , kN, for ball bearings  
 $F_m \approx 0,77 F_{max}$ , kN, for roller bearings

In case of oscillating movements with oscillating angle  $\gamma$ , as shown in fig. 7, equivalent mean load can be calculated with the equation:

$$F_m = \sqrt{p} \frac{\gamma}{90^\circ} F_r, \text{ kN},$$

If the fluctuating load acts in a pure radial direction for radial bearings and in a pure axial direction for thrust bearings, the equivalent dynamic bearing load will be:  $P_r = F_m$ .

For combined loads, with radial load  $F_r$  and axial load  $F_a$  constant in direction and magnitude, the equivalent dynamic load can be calculated using the equation

$$P_r = X F_r + Y F_a, \text{ kN}$$

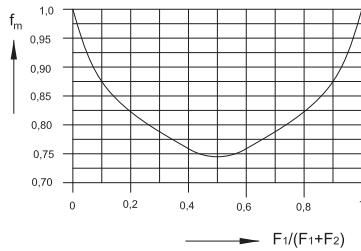


Fig. 5

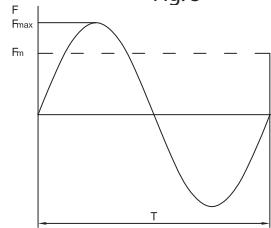


Fig. 6

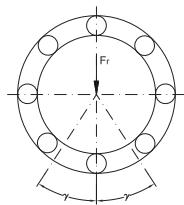


Fig. 7

In case of combined loads, with radial and axial loads changing in time, ratio  $F_r/F_a$  being constant, the equivalent dynamic load can be calculated by:

$$P_m = X F_{rm} + Y F_{am},$$

where:

$P_m$	- equivalent mean dynamic load, kN
$F_{rm}$	- radial mean load, kN
$F_{am}$	- axial mean load, kN
$X, Y$	- factors of radial and axial load.

In case the direction and magnitude of the load change in time and speeds fluctuate in time, the equivalent mean dynamic load will be calculated using the equation:

$$P_m = \sqrt[p]{\frac{P_1^p n_1 + P_2^p n_2 + \dots + P_n^p n_n}{n}}$$

where:

$P_m$	- equivalent mean dynamic load, kN
$P_1$	- equivalent dynamic load for $n_1$ revolutions, kN
$P_2$	- equivalent dynamic load for $n_2$ revolutions, kN
$P_n$	- equivalent dynamic load for $n_n$ revolutions, kN
$n_1$	- number of revolutions for load $P_1$
$n_2$	- number of revolutions for load $P_2$
$n_n$	- number of revolutions for load $P_n$
$n$	- number of revolutions ( $n = n_1 + n_2 + \dots + n_n$ )
$p$	- exponent: -3 for ball bearings, - 10/3 for roller bearings

## Basic dynamic load of a bearing group

In case of ball and roller bearings especially, a bearing group of the same type mounted close together is required, so that heavy radial loads can be carried.

In order to take over the load uniformly these bearings should be mounted in order to equal the diameter deviations to the radial clearances.

These deviations must be kept below 1/2 of the admitted tolerance class.

Basic dynamic load for a bearing group, as a function of the basic load of the single bearing, can be calculated using the equation:

$$C_{ri} = C_r i^n,$$

where:

$C_{ri}$	- basic dynamic load of the bearing group, kN
$C_r$	- basic dynamic load of the single bearing, selected from the tables,
$i$	- number of bearings of the same type, mounted close together,
$n$	- exponent depending on the bearing type: 0,7 - for ball bearings 7/9 - for roller bearings

Values of  $i^n$  are given in table 2.6.

Values for $i^n$		
$i$	$i^{0,7}$	$i^{7/9}$
2	1,62	1,71
2	2,16	2,35
4	2,64	2,94

Table 2.6

Values for factor $a_1$		
Reliability, %	$L_{na}$	$a_1$
90	$L_{10a}$	1
95	$L_{5a}$	0,62
96	$L_{4a}$	0,53
97	$L_{3a}$	0,44
98	$L_{2a}$	0,33
99	$L_{1a}$	0,21

Table 2.7

The equivalent dynamic load for each group of bearings is calculated considering the specifications in the introductory text preceding the respective group.

### Adjusted rating life

Basic rating life  $L_{10h}$  is often satisfactory for bearing performances. This life means a reliability of 90% for material and a modern and usual manufacturing technology, as well as for conventional operating conditions.

For a reliability over 90% (100-n)%, ISO recommends steels elaborated in better conditions, high level manufacturing technologies and specific operating conditions. In this case, adjusted rating life can be calculated as follows:

$$L_{na} = a_1 a_2 a_3 L_{10} \text{ or } L_{na} = a_1 a_2 a_3 \left( \frac{C}{P} \right)^p$$

where:

- $L_{na}$  - adjusted rating life, millions of revolutions
- $a_1$  - life adjustment factor considering reliability
- $a_2$  - life adjustment factor considering the material and manufacturing conditions
- $a_3$  - life adjustment factor considering the operating conditions.

In case of life adjustment factors  $a_1$ ,  $a_2$ ,  $a_3$  greater than 1, when calculating adjusted rating life, prudence and familiarity with bearing manufacturing and operating conditions, including shaft bending and housing stiffness are recommended.

### Life adjustment factor $a_1$ for reliability

The bearing failure, caused by fatigue, is subjected to certain statistic laws. Therefore, this fact is recommended to be considered when calculating the bearing life.

Values of the life adjustment factor  $a_1$  for reliabilities over than 90% are given in table 2.7.

### Life adjustment factor $a_2$ for material

Life adjustment factor  $a_2$  takes into account the properties of the material, heat treatment of the steel and maufacturing technologies. For URB bearings,  $a_2=1$  is recommended.

### Life adjustment factor $a_{23}$ for operating conditions

The longest life of a bearing can be reached in case of hydrodynamic lubrication, namely where there is no direct contact between rolling elements and raceway due to the lubricant film. In this field, many studies have been done by world leading bearing manufacturing companies. These studies showed that there is relationship between life adjustment factor  $a_2$  for material and life adjustment factor  $a_3$  for operating conditions. Preferably these factors should be unified, obtaining factor  $a_{23}$ . In this case, adjusted rating life would be:

$$L_{na} = a_1 a_{23} L_{10} \text{ or } L_{na} = a_1 a_{23} L_{10h}$$

These values of  $a_{23}$  coefficient depend on the lubricant used for bearing lubrication, namely on the ratio of the oil viscosity at +40°C,  $v$  (initial value) to the viscosity required for adequate lubrication at the operating temperature  $v_1$ . The values are given in table 2.8.

Values for factor $a_{23}$								
$\frac{v}{v_1}$	0,1	0,2	0,5	1	1,5	2	3	4
$a_{23}$	0,45	0,55	0,75	1	1,3	1,6	2	2,5

Table 2.8

The values of viscosity  $v_1$ , as a function of the mean bearing diameter and operating speed, are given in the diagram fig. 8.

Kinematic viscosity  $v$  at the temperature of +40°C can be determined from the diagram fig. 9 in accordance with ISO, if the bearing operating temperature is known.

In case of grease lubrication, calculation should be done considering the basic oil viscosity and the value of the life adjustment factor  $a_{23}$  will be smaller than 1.

Example of oil kinematic viscosity calculation for bearing lubrication:

The bearing 6212 operates at a speed of 3500 r/min and a temperature of +70°C.

Mean diameter will be:

$$0,5(d+D) = 0,5(60+110) = 85 \text{ mm}$$

From the diagram fig. 9, at a temperature of +70°C, for a viscosity  $v_1 = 8 \text{ mm}^2/\text{s}$ , the viscosity at +40°C is 20  $\text{mm}^2/\text{s}$  (cSt).

In this case should be selected an oil in accordance with ISO VG22 with kinematic viscosity limits:  $v_{\min} = 19,8 \text{ mm}^2/\text{s}$  (cSt) and  $v_{\max} = 24,2 \text{ mm}^2/\text{s}$  (cSt)

In case of bearing operating at temperatures higher than +150°C, an adjustment factor  $f_t$  for temperature should be added to the life adjustment factor  $a_{23}$ . Adjusted rating life will be:

$$L_{na} = a_1 a_{23} f_t L_{10} \text{ or } L_{na} = a_1 a_{23} f_t L_{10h}$$

Values for the life adjustment factor  $f_t$  for temperature are given in table 2.9.

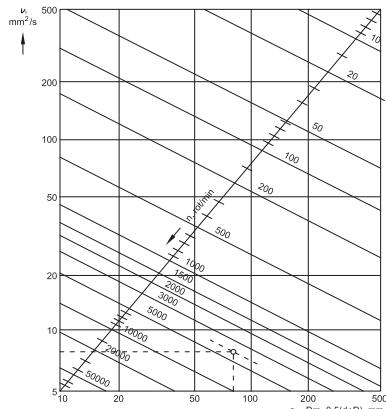


Fig. 8

Values for operating temperature factor $f_t$				
Operating temperature, t°C	Table 2.9			
	150	200	250	300
$f_t$	1	0,73	0,42	0,22

## Static load

When the bearing is stationary or rotates at slow movements or very low speeds (lower than 10 r/min), basic static load is not determined by the

material fatigue but by permanent deformation caused at the rolling element/raceway contact.

It is also the case of rotating bearings, when they have to sustain heavy shock loads which act during a fraction of their revolution.

Generally, the value of the load may increase up to the value of the basic static load  $C_0$ , without altering the bearing operating properties.

## Equivalent static load

Combined static load (radial and axial load acting simultaneously on bearing) must be converted into an equivalent static bearing load. This is defined as the load (radial for radial bearings and axial for thrust bearings) which is applied, would cause the same permanent deformation in the bearing as the real load operating upon it.

Equivalent static load is obtained from the general equation:

$$P_0 = X_0 F_r + Y_0 F_a, \text{ kN},$$

where:

- $P_0$  - equivalent static bearing load, kN,
- $F_r$  - radial component of the heaviest static load, kN,
- $F_a$  - axial component of the heaviest static load, kN,
- $X_0$  - radial load factor of the bearing,
- $Y_0$  - axial load factor of the bearing.

Data needed to calculate equivalent static load can be found in text and in bearing tables.

## Requisite basic static load rating

When determining bearing size on the basis of the static load, a static safety factor  $s_0$  is used.

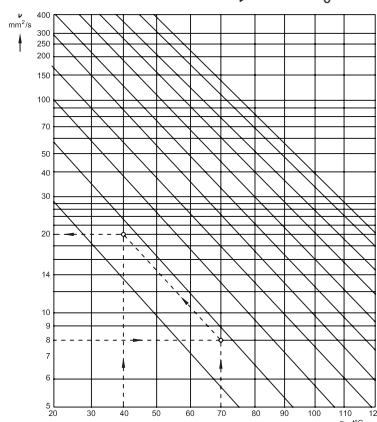


Fig. 9

The requisite basic static load is calculated using the equation:

$$C_{r0} = s_0 P_{r0}, \text{ kN},$$

where:

- $C_{r0}$  - basic static load rating, kN,
- $s_0$  - static safety factor, table 2.11,
- $P_{r0}$  - equivalent static load, kN.

At high temperatures, life of the material decreases and the static load carrying capacity of bearings is reduced.

For high temperatures, basic static load is calculated using the equation:

$$C_{r0} = f_{ot} s_0 P_{r0}, \text{ kN},$$

The values of factor  $f_{ot}$  depending on temperature is given in table 2.10.

Values for temperature factor $f_{ot}$					
Operating temperature, t°C	150	200	250	300	Table 2.10
$f_{ot}$	1	0,95	0,85	0,75	

## Non-rotating bearings

In case of non-rotating bearings, the values of static safety factor  $s_0$ , for certain applications are given in table 2.11. These values are also valid for bearings with oscillating movements.

Values for static safety factor $s_0$	
Application	$s_0$
Variable pitch propeller for aircraft	0,5
Gates for barrages, dams, sluices	
Opening bridges	1,5
Crane hooks for:	
- large cranes without additional loads	1,5
- small cranes with additional dynamic loads	1,6

## Rotating bearings

In case of fluctuating or oscillating loads and especially when heavy shock loads are acting during a fraction of revolution, it is necessary to check if the bearing has the proper static load carrying capacity.

Heavy shock loads, higher than the basic static bearing load, produce permanent deformations not uniformly distributed on raceway, which influence negatively upon bearing running.

Generally, heavy shock loads cannot be exactly calculated and in certain cases they produce deformations of bearing housing and

consequently an unfavorable load distribution in bearing.

When a bearing rotates under maximum load, raceway becomes uniformly deformed on all its outer surface without any imprint.

For various operating conditions, maximum load acting upon the bearing is calculated with static safety factor  $s_0$ , depending on the vibrations and shock loads.

The values of static safety factor are given in table 2.12.

## Values for static safety factor $s_0$

Table 2.12

Type of operation	Requirements regarding quiet running		
	Unimportant	Normal	High
Ball bearings			
Roller			
<b>Smooth, vibration-free</b>	0,5	1	1
<b>Normal</b>	1,5	2	3,5
<b>Heavy shock loads</b>	>1,5	>2,5	>4
Ball bearings			
Roller			

For bearing with a known equivalent static load, static safety factor  $s_0$  is necessary to be checked using the equation:

$$s_0 = \frac{C_{r0}}{P_{r0}}$$

If the value of  $s_0$  is less than recommended in table 2.12, then a bearing with a higher basic static load carrying capacity should be selected.

## Basic static load for a group of bearings

Where more bearings of the same type are mounted close together to take over a static load, the load magnitude supported by these bearings will be calculated from:

$$C_{ori} = C_{or} i,$$

where:

- $C_{ori}$  - basic static load of the bearing group,

- $C_{or}$  - basic static load of the single bearing (from tables),

- $i$  - number of bearings.

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



# Bearing tolerances

Bearing tolerances have been internationally standardized in accordance with ISO 492, ISO 199, ISO 582, ISO 1132.

Bearings are generally manufactured to the tolerance class P0. At request, they can also be manufactured to the tolerance classes P6, P6X, P5, P4 and P2. These bearings are used for special applications, such as very accurate shaft guidance or very high speeds.

The values of the limit deviations for these tolerance classes are given for:

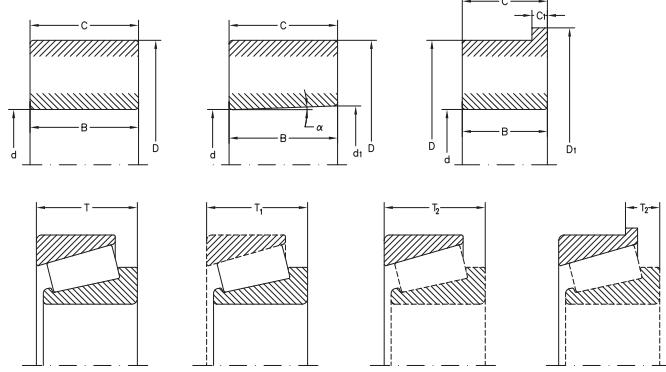
- the overall dimensions of:
  - deep groove ball bearings, angular contact ball bearings, self-aligning ball bearings, spherical roller bearings, cylindrical roller bearings, needle roller bearings, tapered roller bearings,
  - tapered roller bearing with metric (mm) and inch dimensions,
  - tapered bore bearings,
  - thrust ball bearings, angular contact thrust ball bearings, cylindrical roller thrust bearings, needle roller thrust bearings,
  - mounting chamfer.

## Symbols

$d$	- nominal bore diameter or shaft washer nominal bore diameter for thrust bearings
$d_1$	- nominal diameter at the theoretical large end of the tapered bore
$d_2$	- nominal bore diameter of the shaft washer for double directions thrust bearings
$d_s$	- deviation of single bore diameter
$d_{psmax}$	- maximum bore diameter, in a single radial plane

$d_{psmin}$	- minimum bore diameter, in a single radial plane
$\Delta_{ds}$	- deviation of a single bore diameter $\Delta_{ds} = d_s - d$
$d_{mp}$	- mean bore diameter, in a single radial plane $d_{mp} = (d_{psmax} + d_{psmin})/2$
$\Delta_{dmp}$	- deviation of the mean bore diameter in a single radial plane; or deviation of the mean diameter at the theoretical small end of the tapered bore, in case of tapered bore bearings; or deviation of the mean bore diameter of the shaft washer in a single radial plane for single direction thrust bearings $\Delta_{dmp} = d_{mp} - d$
$\Delta_{d1mp}$	- deviation of the mean diameter at the theoretical large end of the tapered bore $\Delta_{d1mp} = d_{1mp} - d$
$\Delta_{d2mp}$	- deviation of the mean bore diameter of the shaft washer for a double directions thrust bearings, in a single radial plane.
$V_{dp}$	- bore diameter variation in a single radial plane; or bore diameter variation of the shaft washer in a single radial plane, for single direction thrust bearings $V_{dp} = d_{psmax} - d_{psmin}$
$V_{d2p}$	- bore diameter variation of the shaft washer for double directions thrust bearings, in a single radial plane
$V_{dmp}$	- mean bore diameter variation (valid only for cylindrical bore) $V_{dmp} = d_{mpmax} - d_{mpmin}$
$\alpha$	- nominal half-angle of the tapered bore
$D$	- nominal outside diameter or housing washer nominal diameter
$D_1$	- nominal outside diameter of the outer ring rib
$D_s$	- single outside diameter

$D_{psmax}$	- maximum outside diameter in a single radial plane	$\Delta_{T1s}$	- deviation of the single width of inner ring and tapered roller assembly $\Delta T_{1s} = T_{1s} - T_1$
$D_{psmin}$	- minimum outside diameter in a single radial plane	$T_2$	- nominal width of the outer ring assembly
$\Delta D_s$	- deviation of the single outside diameter $\Delta D_s = D_s - D$	$T_{2s}$	- single width of the outer ring assembly
$D_{mp}$	- mean outside diameter, in a single plane $= (D_{psmax} + D_{psmin})/2$	$\Delta_{T2s}$	- deviation of the single width of outer ring assembly $\Delta T_{2s} = T_{2s} - T_2$
$\Delta D_{mp}$	- deviation of the mean outside diameter in a single radial plane; or deviation of the mean diameter of housing washer in a single radial plane, for thrust bearings $\Delta D_{mp} = D_{mp} - D$	$K_{ia}$	- radial runout of assembled bearing inner ring
$V_{DP}$	- outside diameter variation in a single radial plane; or housing washer diameter variation in a single radial plane for double direction thrust bearings $V_{DP} = D_{psmax} - D_{psmin}$	$K_{ea}$	- radial runout of assembled bearing outer ring
$V_{Dmp}$	- mean outside diameter variation	$S_d$	- side face runout with reference to bore of the inner ring
$B$	- nominal width of the inner ring	$S_D$	- variation in inclination of outside cylindrical surface to outer ring side face
$B_s$	- single width of the inner ring	$S_{ia}$	- side face runout of assembled inner ring with reference to raceway
$\Delta B_s$	- inner ring single width deviation $\Delta B_s = B_s - B$	$S_{ea}$	- side face runout of assembled outer ring with reference to raceway
$V_{Bs}$	- inner ring single width variation	$S_i$	- thickness variation measured from middle of raceway to back seating face of shaft washer
$C$	- nominal width of the outer ring	$S_e$	- thickness variation measured from middle of raceway to back face of housing washer
$C_s$	- single width of the outer ring	$\Delta_{Hs}$	- deviation of mounting height of single direction thrust ball and roller bearings
$\Delta C_s$	- deviation of the outer ring single width $\Delta C_s = C_s - C$	$\Delta_{H1s}$	- deviation of mounting height of thrust ball bearings with spherodized housing washer
$V_{Cs}$	- single width variation of the outer ring $V_{Cs} = C_{smax} - C_{smin}$	$\Delta_{H2s}$	- deviation of mounting height of double direction thrust ball and roller bearings
$T$	- nominal width of tapered roller bearings	$\Delta_{H3s}$	- deviation of mounting height of double direction thrust ball bearings with spherodized housing washer
$T_s$	- single width of tapered roller bearings		
$\Delta T_s$	- deviation of the single width of taper roller bearings $\Delta T_s = T_s - T$		
$T_1$	- nominal width of the inner ring and tapered roller assembly		
$T_{1s}$	- single width of the inner ring and tapered roller assembly		



**Radial bearings (excepting tapered roller bearings)**  
**Tolerance class P0**

Inner ring														Table 3.1		
Deviations $\mu\text{m}$		$d$ mm	$\Delta_{dmp}$	$V_{dp}$	$V_{dmp}$				$K_{ia}$	$\Delta_{Bs}$	$V_{Bs}$					
Diameter series					all		normal				modified <sup>2)</sup>					
over	up to	high	low	max.	max.	max.	max.	max.			high	low	low	max.		
<b>0,6<sup>1)</sup></b>	<b>2,5</b>	0	-8	10	8	6	6	10	0	-40	-	12				
<b>2,5</b>	<b>10</b>	0	-8	10	8	6	6	10	0	-120	-250	15				
<b>10</b>	<b>18</b>	0	-8	10	8	6	6	10	0	-120	-250	20				
<b>18</b>	<b>30</b>	0	-10	13	10	8	8	13	0	-120	-250	20				
<b>30</b>	<b>50</b>	0	-12	15	12	9	9	15	0	-120	-250	20				
<b>50</b>	<b>80</b>	0	-15	19	19	11	11	20	0	-150	-380	25				
<b>80</b>	<b>120</b>	0	-20	25	25	15	15	25	0	-200	-380	25				
<b>120</b>	<b>180</b>	0	-25	31	31	19	19	30	0	-250	-500	30				
<b>180</b>	<b>250</b>	0	-30	38	38	23	23	40	0	-300	-500	30				
<b>250</b>	<b>315</b>	0	-35	44	44	26	26	50	0	-350	-500	35				
<b>315</b>	<b>400</b>	0	-40	50	50	30	30	60	0	-400	-630	40				
<b>400</b>	<b>500</b>	0	-45	56	56	34	34	65	0	-450	-	50				
<b>500</b>	<b>630</b>	0	-50	63	63	38	38	70	0	-500	-	60				
<b>630</b>	<b>800</b>	0	-75	-	-	-	-	80	0	-750	-	70				

1) This value included.

2) It refers to isolated bearing ring for paired mounting or stack mounting.

Outer ring														Table 3.2		
Deviations $\mu\text{m}$		$D$ mm	$\Delta_{Dmp}$	$V_{Dp}$ <sup>3)</sup>	$V_{Dmp}$ <sup>3)</sup>				$K_{ea}$	$\Delta_{Cs}$	$V_{Cs}$					
Open bearings					Shielded bearings <sup>2)</sup>											
over	up to	high	low	max.	max.	max.	max.	max.			max.	high	low	max.		
<b>2,5<sup>1)</sup></b>	<b>6</b>	0	-8	10	8	6	10	6	15	Values are identical to $\Delta_{Bs}$ and $V_{Bs}$ for the inner ring of the same bearing.						
<b>6</b>	<b>18</b>	0	-8	10	8	6	10	6	15							
<b>18</b>	<b>30</b>	0	-9	12	9	7	12	7	15							
<b>30</b>	<b>50</b>	0	-11	14	11	8	16	8	20							
<b>50</b>	<b>80</b>	0	-13	16	13	10	20	10	25							
<b>80</b>	<b>120</b>	0	-15	19	19	11	26	11	35							
<b>120</b>	<b>150</b>	0	-18	23	23	14	30	14	40							
<b>150</b>	<b>180</b>	0	-25	31	31	19	38	19	45							
<b>180</b>	<b>250</b>	0	-30	38	38	23	-	23	50							
<b>250</b>	<b>315</b>	0	-35	44	44	26	-	26	60							
<b>315</b>	<b>400</b>	0	-40	50	50	30	-	30	70							
<b>400</b>	<b>500</b>	0	-45	56	56	34	-	34	80							
<b>500</b>	<b>630</b>	0	-50	63	63	38	-	38	100							
<b>630</b>	<b>800</b>	0	-75	94	94	55	-	55	120							
<b>800</b>	<b>1000</b>	0	-10	125	125	75	-	75	140							

1) This value included.

2) For bearings of diameter series 7,8,9,0 and 1 values are not indicated

3) Values are valid before mounting the snap ring or shields or after their dismounting.

### Tolerance class P6

<b>Inner ring</b>													Table 3.3	
<b>Deviations <math>\mu\text{m}</math></b>		<b>d mm</b>	<b><math>\Delta_{\text{dmp}}</math></b>		<b><math>V_{\text{dp}}</math></b>		<b><math>V_{\text{dmp}}</math></b>		<b><math>K_{\text{ia}}</math></b>	<b><math>\Delta_{\text{Bs}}</math></b>		<b><math>V_{\text{Bs}}</math></b>		
							Diameter series			all	normal	modified <sup>2)</sup>		
							7,8,9    0,1    2,3,4							
over	up to		high	low	max.	max.	max.	max.	max.	high	low	low	max.	
<b>0,6<sup>1)</sup></b>	<b>2,5</b>	0	-7	9	7	5	5	5	0	-40	-	12		
<b>2,5</b>	<b>10</b>	0	-7	9	7	5	5	6	0	-120	-250	15		
<b>10</b>	<b>18</b>	0	-7	9	7	5	5	7	0	-120	-250	20		
<b>18</b>	<b>30</b>	0	-8	10	8	6	6	8	0	-120	-250	20		
<b>30</b>	<b>50</b>	0	-10	13	10	8	8	10	0	-120	-250	20		
<b>50</b>	<b>80</b>	0	-12	15	15	9	9	10	0	-150	-380	25		
<b>80</b>	<b>120</b>	0	-15	19	19	11	11	13	0	-200	-380	25		
<b>120</b>	<b>180</b>	0	-18	23	23	14	14	18	0	-250	-500	30		
<b>180</b>	<b>250</b>	0	-22	28	28	17	17	20	0	-300	-500	30		
<b>250</b>	<b>315</b>	0	-25	31	31	19	19	25	0	-350	-500	35		
<b>315</b>	<b>400</b>	0	-30	38	38	23	23	30	0	-400	-630	40		
<b>400</b>	<b>500</b>	0	-35	44	44	26	26	35	0	-450	-	55		
<b>500</b>	<b>630</b>	0	-40	50	50	30	30	40	0	-500	-	50		

1) This value included.

2) It refers to isolated bearing ring for paired mounting or stack mounting.

<b>Outer ring</b>													Table 3.4	
<b>Deviations <math>\mu\text{m}</math></b>		<b>D mm</b>	<b><math>\Delta_{\text{Dmp}}</math></b>		<b><math>V_{\text{Dp}}^3</math></b>		<b><math>V_{\text{Dmp}}^3</math></b>		<b><math>K_{\text{ea}}</math></b>	<b><math>\Delta_{\text{Cs}}</math></b>		<b><math>V_{\text{Cs}}</math></b>		
							Open bearings		Shielded bearings <sup>2</sup>					
							Diameter series							
over	up to		high	low	max.	max.	max.	max.	max.	max.	high	low	max.	
<b>2,5<sup>1)</sup></b>	<b>6</b>	0	-7	9	7	5	9	5	8	Values are identical to $\Delta_{\text{Bs}}$ and $V_{\text{Bs}}$ for the inner ring				
<b>6</b>	<b>18</b>	0	-7	9	7	5	9	5	8					
<b>18</b>	<b>30</b>	0	-8	10	8	6	10	6	9					
<b>30</b>	<b>50</b>	0	-9	11	9	7	13	7	10					
<b>50</b>	<b>80</b>	0	-11	14	11	8	16	8	13					
<b>80</b>	<b>120</b>	0	-13	16	16	10	20	10	18					
<b>120</b>	<b>150</b>	0	-15	19	19	11	25	11	20					
<b>150</b>	<b>180</b>	0	-18	23	23	14	30	14	23					
<b>180</b>	<b>250</b>	0	-20	25	25	15	-	15	25					
<b>250</b>	<b>315</b>	0	-25	31	31	19	-	19	30					
<b>315</b>	<b>400</b>	0	-28	35	35	21	-	21	35					
<b>400</b>	<b>500</b>	0	-33	41	41	25	-	25	40					
<b>500</b>	<b>630</b>	0	-38	48	48	29	-	29	50					
<b>630</b>	<b>800</b>	0	-45	56	56	34	-	34	60					
<b>800</b>	<b>1000</b>	0	-60	75	75	45	-	45	75					

1) This value included.

2) For bearings of diameter series 7,8,9,0 and 1 values are not indicated

3) Values are valid before mounting the snap ring or shields or after their dismounting

### Tolerance class P5

<b>Inner ring</b>													Table 3.5
<b>Deviations <math>\mu\text{m}</math></b>		$V_{dp}$	$V_{dmp}$		$K_{ia}$	$S_d$	$S_{ia}^{(2)}$	$\Delta_{Bs}$	$V_{Bs}$				
$d$	$\Delta_{dp}$		max.	max.					all	normal	modified <sup>(3)</sup>		
mm	Diameter series		7,8,9	0,1,2,3,4									
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	low	max.
<b>0,6<sup>(1)</sup></b>	<b>2,5</b>	0	-5	5	4	3	4	7	7	0	-40	-250	5
<b>2,5</b>	<b>10</b>	0	-5	5	4	3	4	7	7	0	-40	-250	5
<b>10</b>	<b>18</b>	0	-5	5	4	3	4	7	7	0	-80	-250	5
<b>18</b>	<b>30</b>	0	-6	6	5	3	4	8	8	0	-120	-250	5
<b>30</b>	<b>50</b>	0	-8	8	6	4	5	8	8	0	-120	-250	5
<b>50</b>	<b>80</b>	0	-9	9	7	5	5	8	8	0	-150	-250	6
<b>80</b>	<b>120</b>	0	-10	10	8	5	6	9	9	0	-200	-380	7
<b>120</b>	<b>180</b>	0	-13	13	10	7	8	10	10	0	-250	-380	8
<b>180</b>	<b>250</b>	0	-15	15	12	8	10	11	13	0	-300	-500	10
<b>250</b>	<b>315</b>	0	-18	18	14	9	13	13	15	0	-350	-500	13
<b>315</b>	<b>400</b>	0	-23	23	18	12	15	15	20	0	-400	-630	15

1) This value included.

2) Applies only to ball bearings.

3) It refers to single bearing ring for paired mounting or stack mounting.

<b>Outer ring</b>													Table 3.6
<b>Deviations <math>\mu\text{m}</math></b>		$V_{Dp}^2$	$V_{Dmp}$		$K_{ea}$	$S_d$	$S_{ea}^{(3)}$	$\Delta_{Cs}$	$V_{Cs}$				
$D$	$\Delta_{Dmp}$		max.	max.					max.	max.	high	low	
mm	Diameter series		7,8,9	0,1,2,3,4									
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.	
<b>2,5<sup>(1)</sup></b>	<b>6</b>	0	-5	5	4	3	5	8	8	Identical to $\Delta_{Bs}$ for the inner ring		5	
<b>6</b>	<b>18</b>	0	-5	5	4	3	5	8	8	to $\Delta_{Bs}$ for the inner ring		5	
<b>18</b>	<b>30</b>	0	-6	6	5	3	6	8	8	to $\Delta_{Bs}$ for the inner ring		5	
<b>30</b>	<b>50</b>	0	-7	7	5	4	7	8	8	to $\Delta_{Bs}$ for the inner ring		5	
<b>50</b>	<b>80</b>	0	-9	9	7	5	8	8	10	to $\Delta_{Bs}$ for the inner ring		6	
<b>80</b>	<b>120</b>	0	-10	10	8	5	10	9	11	to $\Delta_{Bs}$ for the inner ring		8	
<b>120</b>	<b>150</b>	0	-11	11	8	6	11	10	13	to $\Delta_{Bs}$ for the inner ring		8	
<b>150</b>	<b>180</b>	0	-13	13	10	7	13	10	14	to $\Delta_{Bs}$ for the inner ring		8	
<b>180</b>	<b>250</b>	0	-15	15	11	8	15	11	15	to $\Delta_{Bs}$ for the inner ring		10	
<b>250</b>	<b>315</b>	0	-18	18	14	9	18	13	18	to $\Delta_{Bs}$ for the inner ring		11	
<b>315</b>	<b>400</b>	0	-20	20	15	10	20	13	20	to $\Delta_{Bs}$ for the inner ring		13	
<b>400</b>	<b>500</b>	0	-23	23	17	12	23	15	23	to $\Delta_{Bs}$ for the inner ring		15	
<b>500</b>	<b>630</b>	0	-28	28	21	14	25	18	25	to $\Delta_{Bs}$ for the inner ring		18	
<b>630</b>	<b>800</b>	0	-35	35	26	18	30	20	30	to $\Delta_{Bs}$ for the inner ring		20	

1) This value included.

2) Do not apply to shielded bearings.

3) Apply to ball bearings.

### Tolerance class P4

<b>Inner ring</b>													Table 3.7								
<b>Deviations <math>\mu\text{m}</math></b>		$\Delta_{\text{dmp}}, \Delta_{\text{ds}}^2$		$V_{\text{dp}}$	$V_{\text{dmp}}$	$K_{\text{ia}}$	$S_d$	$S_{\text{la}}^{3)}$	$\Delta_{\text{Bs}}$	$V_{\text{Bs}}$											
<b>d</b>	<b>mm</b>																				
		Diameter series																			
		7,8,9 0,1,2,3,4																			
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	low	max.								
<b>0,6<sup>1)</sup></b>	<b>2,5</b>	0	-4	4	3	2	2,5	3	3	0	-40	-250	2,5								
<b>2,5</b>	<b>10</b>	0	-4	4	3	2	2,5	3	3	0	-40	-250	2,5								
<b>10</b>	<b>18</b>	0	-4	4	3	2	2,5	3	3	0	-80	-250	2,5								
<b>18</b>	<b>30</b>	0	-5	5	4	2,5	3	4	4	0	-120	-250	2,5								
<b>30</b>	<b>50</b>	0	-6	6	5	3	4	4	4	0	-120	-250	3								
<b>50</b>	<b>80</b>	0	-7	7	5	3,5	4	5	5	0	-150	-250	4								
<b>80</b>	<b>120</b>	0	-8	8	6	4	5	5	5	0	-200	-380	4								
<b>120</b>	<b>180</b>	0	-10	10	8	5	6	6	7	0	-250	-380	5								
<b>180</b>	<b>250</b>	0	-12	12	9	6	8	7	8	0	-300	-500	6								

1) This value included.

2) Applies only to bearings of diameter series 0,1,2,3,4.

3) Apply only to ball bearings.

4) It refers to single bearing ring for paired mounting or stack mounting.

<b>Outer ring</b>													Table 3.8								
<b>Deviations <math>\mu\text{m}</math></b>		$\Delta_{\text{Dmp}}, \Delta_{\text{Ds}}^2$		$V_{\text{Dp}}^3$	$V_{\text{Dmp}}$	$K_{\text{ea}}$	$S_d$	$S_{\text{ea}}^{4)}$	$\Delta_{\text{Cs}}$	$V_{\text{Cs}}$											
<b>D</b>	<b>mm</b>																				
		Diameter series																			
		7,8,9 0,1,2,3,4																			
over	up to	high	low	max.	max.	max.	max.	max.	max.	high	low	max.									
<b>2,5<sup>1)</sup></b>	<b>6</b>	0	-4	4	3	2	3	4	5	Identical to $\Delta_{\text{Bs}}$ for the inner ring	2,5										
<b>6</b>	<b>18</b>	0	-4	4	3	2	3	4	5	inner ring	2,5										
<b>18</b>	<b>30</b>	0	-5	5	4	2,5	4	4	5		2,5										
<b>30</b>	<b>50</b>	0	-6	6	5	3	5	4	5		2,5										
<b>50</b>	<b>80</b>	0	-7	7	5	3,5	5	4	5		3										
<b>80</b>	<b>120</b>	0	-8	8	6	4	6	5	6		4										
<b>120</b>	<b>150</b>	0	-9	9	7	5	7	5	7		5										
<b>150</b>	<b>180</b>	0	-10	10	8	5	8	5	8		5										
<b>180</b>	<b>250</b>	0	-11	11	8	6	10	7	10		7										
<b>250</b>	<b>315</b>	0	-13	13	10	7	11	8	10		7										
<b>315</b>	<b>400</b>	0	-15	15	11	8	13	10	13		8										

1) This value included.

2) Apply to bearings of diameter series 0,1,2,3 and 4.

3) Do not apply to sealed and shielded bearings.

4) Apply only to ball bearings.

## Tolerance class P2

<b>Inner ring</b>													Table 3.9
<b>Deviations <math>\mu\text{m}</math></b>						<b><math>V_{dp}</math></b>	<b><math>V_{dmp}</math></b>	<b><math>K_{ia}</math></b>	<b><math>S_d</math></b>	<b><math>S_{ia}^2</math></b>	<b><math>\Delta_{Bs}</math></b>	<b><math>V_{Bs}</math></b>	
<b>d mm</b>	<b><math>\Delta_{dmp}, \Delta_{ds}</math></b>	over	up to	high	low	max.	max.	max.	max.	all	normal	modified <sup>4)</sup>	
<b>0,6<sup>1)</sup></b>	<b>2,5</b>	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5	0	-40	-250	1,5
<b>2,5</b>	<b>10</b>	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5	0	-40	-250	1,5
<b>10</b>	<b>18</b>	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5	0	-80	-250	1,5
<b>18</b>	<b>30</b>	0	-2,5	2,5	1,5	2,5	1,5	1,5	2,5	0	-120	-250	1,5
<b>30</b>	<b>50</b>	0	-2,5	2,5	1,5	2,5	1,5	2,5	2,5	0	-120	-250	1,5
<b>50</b>	<b>80</b>	0	-4	4	2	2,5	1,5	2,5	2,5	0	-150	-250	1,5
<b>80</b>	<b>120</b>	0	-5	5	2,5	2,5	2,5	2,5	2,5	0	-200	-380	2,5
<b>120</b>	<b>150</b>	0	-7	7	3,5	2,5	2,5	2,5	2,5	0	-250	-380	2,5
<b>150</b>	<b>180</b>	0	-7	7	3,5	5	4	5	5	0	-300	-380	4
<b>180</b>	<b>250</b>	0	-8	8	4	5	5	5	5	0	-350	-500	5

1) This value included.

2) Apply only to ball bearings.

<b>Outer ring</b>													Table 3.10
<b>Deviations <math>\mu\text{m}</math></b>						<b><math>V_{Dp}</math></b>	<b><math>V_{Dmp}</math></b>	<b><math>K_{ea}</math></b>	<b><math>S_D^{2),3)}</math></b>	<b><math>S_{ea}^3</math></b>	<b><math>\Delta_{Cs}</math></b>	<b><math>V_{Cs}</math></b>	
<b>D mm</b>	<b><math>\Delta_{Dmp}, \Delta_{Ds}</math></b>	over	up to	high	low	max.	max.	max.	max.	max.	high	low	max.
<b>2,5<sup>1)</sup></b>	<b>6</b>	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5	1,5	Identical to $\Delta_{Bs}$ for the inner ring.	1,5	
<b>6</b>	<b>18</b>	0	-2,5	2,5	1,5	1,5	1,5	1,5	1,5	1,5		1,5	
<b>18</b>	<b>30</b>	0	-4	4	2	2,5	1,5	2,5	2,5	2,5		1,5	
<b>30</b>	<b>50</b>	0	-4	4	2	2,5	1,5	2,5	2,5	2,5		1,5	
<b>50</b>	<b>80</b>	0	-4	4	2	4	1,5	4	4	4		1,5	
<b>80</b>	<b>120</b>	0	-5	5	2,5	5	2,5	5	5	5		2,5	
<b>120</b>	<b>150</b>	0	-5	5	2,5	5	2,5	5	5	5		2,5	
<b>150</b>	<b>180</b>	0	-7	7	3,5	5	2,5	5	5	5		2,5	
<b>180</b>	<b>250</b>	0	-8	8	4	7	4	7	7	7		4	
<b>250</b>	<b>315</b>	0	-8	8	4	7	5	7	7	7		5	
<b>315</b>	<b>400</b>	0	-10	10	5	8	7	8	8	8		7	

1) This value included.

2) De not apply to bearings with rib on the outer ring

3) Apply only to ball bearings.

### Tolerance class SP

<b>Inner ring</b>																
Table 3.11																
<b>Deviations <math>\mu\text{m}</math></b>																
<b>d</b> mm	Cylindrical bore				Tapered bore							<b>V<sub>Bs</sub></b>	<b>K<sub>ia</sub></b>	<b>S<sub>d</sub></b>	<b>S<sub>ia</sub></b>	
over mm	up to mm	low	high	max.	low	high	max.	low	high	low	high	max.	max.	max.	max.	
-	<b>18</b>	-5	0	3	-	-	-	-	-	-100	0	5	3	8	8	
	<b>18</b>	<b>30</b>	-6	0	3	0	+10	3	0	+4	-100	0	5	3	8	8
	<b>30</b>	<b>50</b>	-8	0	4	0	+12	4	0	+4	-125	0	5	4	8	8
	<b>50</b>	<b>80</b>	-9	0	5	0	+15	5	0	+5	-150	0	6	4	8	8
	<b>80</b>	<b>120</b>	-10	0	5	0	+20	5	0	+6	-200	0	7	5	9	9
	<b>120</b>	<b>180</b>	-13	0	7	0	+25	7	0	+8	-250	0	8	6	10	10
	<b>180</b>	<b>250</b>	-15	0	8	0	+30	8	0	+10	-300	0	10	8	11	13
	<b>250</b>	<b>315</b>	-18	0	9	0	+35	9	0	+12	-350	0	13	10	13	15
	<b>315</b>	<b>400</b>	-23	0	12	0	+40	12	0	+13	-400	0	15	12	15	20

<b>Outer ring</b>												
Table 3.12												
<b>Deviations <math>\mu\text{m}</math></b>												
<b>D</b> mm	<b><math>\Delta_{Dmp}, \Delta_{Ds}</math></b>		<b>V<sub>Dp</sub></b>	<b>K<sub>ea</sub></b>	<b>S<sub>D</sub></b>	<b>S<sub>ea</sub></b>	<b><math>\Delta_{Cs}</math></b>	<b>V<sub>Cs</sub></b>				
over mm	up to mm	low	high	max.	max.	max.	max.	high				
<b>30</b>	<b>50</b>	-7	0	4	5	8	8	Identical to $\Delta_{Bs}$ and $V_{Bs}$ for the inner ring				
<b>50</b>	<b>80</b>	-9	0	5	5	8	10					
<b>80</b>	<b>120</b>	-10	0	5	6	9	11					
<b>120</b>	<b>150</b>	-11	0	6	7	10	13					
<b>150</b>	<b>180</b>	-13	0	7	8	10	14					
<b>180</b>	<b>250</b>	-15	0	8	10	11	15					
<b>250</b>	<b>315</b>	-18	0	9	11	13	18					
<b>315</b>	<b>400</b>	-20	0	10	13	13	20					
<b>400</b>	<b>500</b>	-23	0	18	20	20	30					

### Tolerance class UP

<b>Inner ring</b>															
Table 3.13															
<b>Deviations <math>\mu\text{m}</math></b>															
<b>d</b> mm	Cylindrical bore				Tapered bore				$\Delta_{B_S}$	$V_{B_S}$	$K_{i_a}$	$S_d$	$S_{i_a}$		
over -	up to 18	low -4	high 0	max. 2	low 0	high +6	max. 3	low 0	high -25	low 0	high 1,5	max. 1,5	max. 2	max. 3	
18	30	-5	0	3	0	+6	3	0	+2	-25	0	1,5	1,5	3	3
30	50	-6	0	3	0	+8	3	0	+3	-30	0	2	2	3	3
50	80	-7	0	4	0	+9	4	0	+3	-40	0	3	2	4	3
80	120	-8	0	4	0	+10	4	0	+4	-50	0	3	3	4	4
120	180	-10	0	5	0	+13	5	0	+5	-60	0	4	3	5	6
180	250	-12	0	6	0	+15	6	0	+7	-75	0	5	4	6	7
250	315	-18	0	9	0	+18	9	0	+8	-90	0	6	5	6	8
315	400	-23	0	12	0	+23	12	0	+9	-100	0	8	6	8	9

<b>Outer ring</b>									
Table 3.14									
<b>Deviations <math>\mu\text{m}</math></b>									
<b>D</b> mm	$\Delta_{D_{mp}}, \Delta_{D_s}$		$V_{D_p}$	$K_{e_a}$	$S_D$	$S_{e_a}$	$\Delta_{C_s}$	$V_{C_s}$	
over -	up to 30	low -5	high 0	max. 3	max. 3	max. 2	max. 4	Identical to $\Delta_{B_S}$ and $V_{B_S}$ for the inner ring	
30	50	-5	0	3	3	2	4	Identical to $\Delta_{B_S}$ and $V_{B_S}$ for the inner ring	
50	80	-6	0	3	3	2	4		
80	120	-7	0	4	3	3	5		
120	150	-8	0	4	4	3	6		
150	180	-9	0	5	4	3	7		
180	250	-10	0	5	5	4	9		
250	315	-12	0	6	6	4	9		
315	400	-14	0	7	7	5	12		
400	500	-23	0	12	8	-	12		

### 3.2. Tapered roller bearings Tolerance class P0 and P6X

Inner ring						
Deviations µm						
d mm		$\Delta_{dmp}$	$V_{dp}$	$V_{dmp}$	$K_{ia}$	
over	up to	high	low	max.	max.	max.
<b>10<sup>1)</sup></b>	<b>18</b>	0	-12	12	9	15
<b>18</b>	<b>30</b>	0	-12	12	9	18
<b>30</b>	<b>50</b>	0	-12	12	9	20
<b>50</b>	<b>80</b>	0	-15	15	11	25
<b>80</b>	<b>120</b>	0	-20	20	15	30
<b>120</b>	<b>180</b>	0	-25	25	19	35
<b>180</b>	<b>250</b>	0	-30	30	23	50
<b>250</b>	<b>315</b>	0	-35	35	26	60
<b>315</b>	<b>400</b>	0	-40	40	30	70

Table 3.15

Outer ring						
Deviations µm						
D mm		$\Delta_{Dmp}$	$V_{Dp}$	$V_{Dmp}$	$K_{ea}$	
over	up to	high	low	max.	max.	max.
<b>18<sup>1)</sup></b>	<b>30</b>	0	-12	12	9	18
<b>30</b>	<b>50</b>	0	-14	14	11	20
<b>50</b>	<b>80</b>	0	-16	16	12	25
<b>80</b>	<b>120</b>	0	-18	18	14	35
<b>120</b>	<b>150</b>	0	-20	20	15	40
<b>150</b>	<b>180</b>	0	-25	25	19	45
<b>180</b>	<b>250</b>	0	-30	30	23	50
<b>250</b>	<b>315</b>	0	-35	35	26	60
<b>315</b>	<b>400</b>	0	-40	40	30	70
<b>400</b>	<b>500</b>	0	-45	45	34	80

Table 3.16

1) This value included.

1) This value included.

**Note:** Limit deviations of the diameter  $D_1$  of the outer ring rib for bearings with ribs are in accordance with tolerance class h9.

### Tolerance class P0

Inner and outer ring									
Deviations µm									
d mm		$\Delta_{Bs}, \Delta_{Cs}$	$\Delta_{Ts}$	$\Delta_{T1s}$	$\Delta_{T2s}$				
over	up to	high	low	high	low	high	low	high	low
<b>10<sup>1)</sup></b>	<b>18</b>	0	-120	+200	0	+100	0	+100	0
<b>18</b>	<b>30</b>	0	-120	+200	0	+100	0	+100	0
<b>30</b>	<b>50</b>	0	-120	+200	0	+100	0	+100	0
<b>50</b>	<b>80</b>	0	-150	+200	0	+100	0	+100	0
<b>80</b>	<b>120</b>	0	-200	+200	-200	+100	-100	+100	-100
<b>120</b>	<b>180</b>	0	-250	+350	-250	+150	-150	+200	-100
<b>180</b>	<b>250</b>	0	-300	+350	-250	+150	-150	+200	-100
<b>250</b>	<b>315</b>	0	-350	+350	-250	+150	-150	+200	-100
<b>315</b>	<b>400</b>	0	-400	+400	-400	+200	-200	+200	-200

Table 3.17

1) This value included.

### Tolerance class P6X Inner and outer ring

Diameter limit deviations and radial runout of the inner and outer ring for this tolerance class are the same as those of tolerance class P0.

Deviations µm												Table 3.18
d mm	$\Delta_{Bs}$		$\Delta_{Cs}$		$\Delta_{Ts}$		$\Delta_{T1s}$		$\Delta_{T2s}$			
over	up to	high	low	high	low	high	low	high	low	high	low	
<b>10<sup>1)</sup></b>	<b>18</b>	0	-50	0	-100	+100	0	+50	0	+50	0	
<b>18</b>	<b>30</b>	0	-50	0	-100	+100	0	+50	0	+50	0	
<b>30</b>	<b>50</b>	0	-50	0	-100	+100	0	+50	0	+50	0	
<b>50</b>	<b>80</b>	0	-50	0	-100	+100	0	+50	0	+50	0	
<b>80</b>	<b>120</b>	0	-50	0	-100	+100	0	+50	0	+50	0	
<b>120</b>	<b>180</b>	0	-50	0	-100	+150	0	+50	0	+100	0	
<b>180</b>	<b>250</b>	0	-50	0	-100	+150	0	+50	0	+100	0	
<b>250</b>	<b>315</b>	0	-50	0	-100	+200	0	+100	0	+100	0	
<b>315</b>	<b>400</b>	0	-50	0	-100	+200	0	+100	0	+100	0	

1) This value included.

### Tolerance class P5

Deviations µm												Table 3.19
d mm	$\Delta_{dmp}$		$V_{dp}$		$V_{dmp}$		$K_{ia}$		$S_d$		$\Delta_{Bs}$	$\Delta_{Ts}$
over	up to	high	low	max.	max.	max.	max.	max.	high	low	high	low
<b>10<sup>1)</sup></b>	<b>18</b>	0	-7	5	5	5	7	0	-200	+200	-200	
<b>18</b>	<b>30</b>	0	-8	6	5	5	8	0	-200	+200	-200	
<b>30</b>	<b>50</b>	0	-10	8	5	6	8	0	-240	+200	-200	
<b>50</b>	<b>80</b>	0	-12	9	6	7	8	0	-300	+200	-200	
<b>80</b>	<b>120</b>	0	-15	11	8	8	9	0	-400	+200	-200	
<b>120</b>	<b>180</b>	0	-18	14	9	11	10	0	-500	+350	-250	
<b>180</b>	<b>250</b>	0	-22	17	11	13	11	0	-600	+350	-250	

1) This value included.

Deviations µm												Table 3.20
D mm	$\Delta_{Dmp}$		$V_{Dp}$		$V_{Dmp}$		$K_{ea}$		$S_d$		$\Delta_{Cs}$	
over	up to	high	low	max.	max.	max.	max.	max.	high	low		
<b>18<sup>1)</sup></b>	<b>30</b>	0	-8	6	5	6	8		Identical to $\Delta_{Bs}$ for the inner ring			
<b>30</b>	<b>50</b>	0	-9	7	5	7	8		Identical to $\Delta_{Bs}$ for the inner ring			
<b>50</b>	<b>80</b>	0	-11	8	6	8	8		Identical to $\Delta_{Bs}$ for the inner ring			
<b>80</b>	<b>120</b>	0	-13	10	7	10	9		Identical to $\Delta_{Bs}$ for the inner ring			
<b>120</b>	<b>150</b>	0	-15	11	8	11	10		Identical to $\Delta_{Bs}$ for the inner ring			
<b>150</b>	<b>180</b>	0	-18	14	9	13	10		Identical to $\Delta_{Bs}$ for the inner ring			
<b>180</b>	<b>250</b>	0	-20	15	10	15	11		Identical to $\Delta_{Bs}$ for the inner ring			
<b>250</b>	<b>315</b>	0	-25	19	13	18	13		Identical to $\Delta_{Bs}$ for the inner ring			
<b>315</b>	<b>400</b>	0	-28	22	14	20	13		Identical to $\Delta_{Bs}$ for the inner ring			

1) This value included.

### Tolerance class P4

<b>Inner ring</b>													Table 3.21
<b>Deviations <math>\mu\text{m}</math></b>		$\Delta_{\text{dmp}}, \Delta_{\text{ds}}$		$V_{\text{dp}}$		$V_{\text{dmp}}$		$K_{\text{la}}$	$S_{\text{d}}$	$S_{\text{la}}$	$\Delta_{\text{Bs}}$	$\Delta_{\text{Ts}}$	
$d$ mm	over	up to	high	low	max.	max.	max.	max.	max.	high	low	high	low
<b>10<sup>1)</sup></b>	<b>18</b>	0	-5	4	4	3	3	3	0	-200	+200	-200	
<b>18</b>	<b>30</b>	0	-6	5	4	3	4	4	0	-200	+200	-200	
<b>30</b>	<b>50</b>	0	-8	6	5	4	4	4	0	-240	+200	-200	
<b>50</b>	<b>80</b>	0	-9	7	5	4	5	4	0	-300	+200	-200	
<b>80</b>	<b>120</b>	0	-10	8	5	5	5	5	0	-400	+200	-200	
<b>120</b>	<b>180</b>	0	-13	10	7	6	6	7	0	-500	+350	-250	
<b>180</b>	<b>250</b>	0	-15	11	8	7	7	8	0	-600	+350	-250	

1) This value included.

### Outer ring

<b>Outer ring</b>									Table 3.22			
<b>Deviations <math>\mu\text{m}</math></b>		$\Delta_{\text{Dmp}}, \Delta_{\text{Ds}}$		$V_{\text{Dp}}$		$V_{\text{Dmp}}$		$K_{\text{ea}}$	$S_{\text{D}}$	$S_{\text{ea}}$	$\Delta_{\text{Cs}}$	
$D$ mm	over	up to	high	low	max.	max.	max.	max.	max.	high	low	
<b>18<sup>1)</sup></b>	<b>30</b>	0	-6	5	4	4	4	5				
<b>30</b>	<b>50</b>	0	-7	5	5	5	4	5				
<b>50</b>	<b>80</b>	0	-9	7	5	5	4	5				Identical to $\Delta_{\text{Bs}}$ for the inner ring
<b>80</b>	<b>120</b>	0	-10	8	5	6	5	6				
<b>120</b>	<b>150</b>	0	-11	8	6	7	5	7				
<b>150</b>	<b>180</b>	0	-13	10	7	8	5	8				
<b>180</b>	<b>250</b>	0	-15	11	8	10	7	10				
<b>250</b>	<b>315</b>	0	-18	14	9	11	8	10				
<b>315</b>	<b>400</b>	0	-20	15	10	13	10	13				

1) This value included.

**Note:** Limit deviations of the diameter  $D_1$  of the outer ring rib for bearings with ribs are in accordance with tolerance class h9.

### Tapered roller bearings, inch-metric sizes (AFBMA)

Inner ring - $\Delta_{dmp}$												
Deviations $\mu\text{m}$		Tolerances classes										
d mm		4	2	3	0	00	high	low	high	low	high	low
over	up to	high	low	high	low	high	high	low	high	low	high	low
-	<b>76,2</b>	+13	0	+13	0	+13	0	+13	0	+8	0	
<b>76,2</b>	<b>266,7</b>	+25	0	+25	0	+13	0	+13	0	+8	0	
<b>266,7</b>	<b>304,8</b>	+25	0	+25	0	+13	0	+13	0	-	-	

Table 3.23

Outer ring - $\Delta_{Dmp}$												
Deviations $\mu\text{m}$		Tolerances classes										
D mm		4	2	3	0	00	high	low	high	low	high	low
over	up to	high	low	high	low	high	high	low	high	low	high	low
-	<b>266,7</b>	+25	0	+25	0	+13	0	+13	0	+8	0	
<b>266,7</b>	<b>304,8</b>	+25	0	+25	0	+13	0	+13	0	-	-	
<b>304,8</b>	<b>609,6</b>	+51	0	+51	0	+25	0	-	-	-	-	

Table 3.24

Assembled bearing - $K_{ia}, K_{ea}$						
Deviations $\mu\text{m}$		Tolerances classes				
D mm		4	2	3	0	00
over	up to	max.	max.	max.	max.	max.
-	<b>266,7</b>	51	38	8	4	2
<b>266,7</b>	<b>304,8</b>	51	38	8	4	-
<b>304,8</b>	<b>609,6</b>	51	38	18	-	-

Table 3.25

### Tapered roller bearings, inch-metric sizes (AFBMA)

Assembled bearing - $\Delta_{Ts}$											
Deviations $\mu\text{m}$		Tolerances classes									
d mm		4	2		3		0		00		
over	up to	high	low	high	low	high	low	high	low	high	low
-	<b>101,6</b>	+203	-	+203	0	+203	-203	+203	-203	+203	-203
<b>101,6</b>	<b>266,7</b>	+356	-254	+203	0	+203	-203	+203	-203	+203	-203
<b>266,7</b>	<b>304,8</b>	+356	-254	+203	0	+203	-203	+203	-203	-	-

Table 3.26

Inner roller ring - standard outer ring assembly - $\Delta_{T1s}$											
Deviations $\mu\text{m}$		Tolerances classes									
d mm		4	2		3		0		00		
over	up to	high	low	high	low	high	low	high	low	high	low
-	<b>101,6</b>	+102	0	+102	0	+102	-102	+102	-102	+102	-102
<b>101,6</b>	<b>304,8</b>	+152	-152	+102	0	+102	-102	+102	-102	+102	-102

Table 3.27

Outer ring with gauge inner ring assembly - $\Delta_{T2s}$											
Deviations $\mu\text{m}$		Tolerances classes									
d mm		4	2		3		0		00		
over	up to	high	low	high	low	high	low	high	low	high	low
-	<b>101,6</b>	+102	0	+102	0	+102	-102	+102	-102	+102	-102
<b>101,6</b>	<b>304,8</b>	+203	-102	+102	0	+102	-102	+102	-102	+102	-102

Table 3.28

## Tapered bore bearings

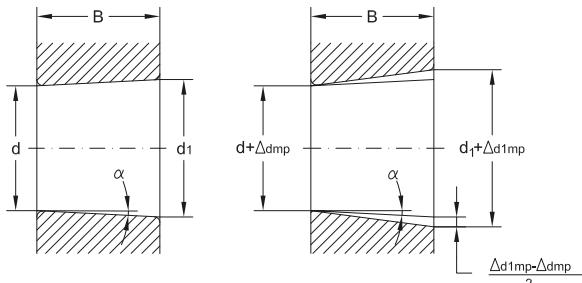
Taper 1:12											
Deviations µm		Normal tolerance class, P6						Tolerance class P5			
d mm	$\Delta_{dmp}$	$V_{dp}^{(1)}$	$\Delta_{d1mp} - \Delta_{dmp}$	$\Delta_{dmp}$	$V_{dp}^{(1)}$	$\Delta_{d1mp} - \Delta_{dmp}$	high	low	max.	high	low
over	up to	high	low	max.	high	low	high	low	max.	high	low
18	30	+21	0	13	+21	0	+13	0	13	+13	0
30	50	+25	0	15	+25	0	+16	0	15	+16	0
50	80	+30	0	19	+30	0	+19	0	19	+19	0
80	120	+35	0	25	+35	0	+22	0	22	+22	0
120	180	+40	0	31	+40	0	+25	0	25	+25	0
180	250	+46	0	38	+46	0	+29	0	29	+29	0
250	315	+52	0	44	+52	0	+32	0	32	+32	0
315	400	+57	0	50	+57	0	+36	0	36	+36	0

Table 3.29

Taper 1:30						
Deviations µm		Normal tolerance class				
d mm	$\Delta_{dmp}$	$V_{dp}^{(1)}$	$\Delta_{d1mp} - \Delta_{dmp}$	high	low	
over	up to	high	low	max.	high	low
80	120	+20	0	25	+40	0
120	180	+25	0	31	+50	0
180	250	+30	0	38	+55	0
250	315	+35	0	44	+60	0
315	400	+40	0	50	+65	0

Table 3.30

1) Applies in all singular planes.



Tapered bore  
Half angle of taper,  $\alpha$

$\alpha = 2^\circ 23' 9,4''$  (taper 1:12)  
 $\alpha = 0^\circ 57' 17,4''$  (taper 1:30)

Nominal diameter,  $d_1$  at the theoretical large end of bore

$$d_1 = d + \frac{1}{12}B \text{ (taper 1:12)}$$

$$d_1 = d + \frac{1}{30}B \text{ (taper 1:30)}$$

### Thrust ball bearings

Shaft washer								Table 3.31	
Deviations µm		P0;P6;P5		P4;P2					
d $\ddot{s}$ i d <sub>2</sub>	mm	$\Delta_{dmp}$	$\Delta_{d2mp}$	V <sub>dp</sub>	V <sub>d2p</sub>	$\Delta_{dmp}$	$\Delta_{d2mp}$	V <sub>dp</sub>	V <sub>d2p</sub>
over	up to	high	low	max.		high	low	max.	
-	<b>18</b>	0	-8	6		0	-7	5	
<b>18</b>	<b>30</b>	0	-10	8		0	-8	6	
<b>30</b>	<b>50</b>	0	-12	9		0	-10	8	
<b>50</b>	<b>80</b>	0	-15	11		0	-12	9	
<b>80</b>	<b>120</b>	0	-20	15		0	-15	11	
<b>120</b>	<b>180</b>	0	-25	19		0	-18	14	
<b>180</b>	<b>250</b>	0	-30	23		0	-22	17	
<b>250</b>	<b>315</b>	0	-35	26		0	-25	19	
<b>315</b>	<b>400</b>	0	-40	30		0	-30	23	
<b>400</b>	<b>500</b>	0	-45	34		0	-35	26	
<b>500</b>	<b>630</b>	0	-50	38		0	-40	30	

Housing washer								Table 3.32	
Deviations µm		P0;P6;P5		P4;P2					
D	mm	$\Delta_{Dmp}$	V <sub>Dp</sub>	$\Delta_{Dmp}$	V <sub>Dp</sub>				
over	up to	high	low	max.		high	low	max.	
<b>10<sup>1)</sup></b>	<b>18</b>	0	-11	8		0	-7	5	
<b>18</b>	<b>30</b>	0	-13	10		0	-8	6	
<b>30</b>	<b>50</b>	0	-16	12		0	-9	7	
<b>50</b>	<b>80</b>	0	-19	14		0	-11	8	
<b>80</b>	<b>120</b>	0	-22	17		0	-13	10	
<b>120</b>	<b>180</b>	0	-25	19		0	-15	11	
<b>180</b>	<b>250</b>	0	-30	23		0	-20	15	
<b>250</b>	<b>315</b>	0	-35	26		0	-25	19	
<b>315</b>	<b>400</b>	0	-40	30		0	-28	21	
<b>400</b>	<b>500</b>	0	-45	34		0	-33	25	
<b>500</b>	<b>630</b>	0	-50	38		0	-38	29	
<b>630</b>	<b>800</b>	0	-75	55		0	-45	34	

1) This value included.

### Variation of shaft washer and housing washer thickness

Table 3.33

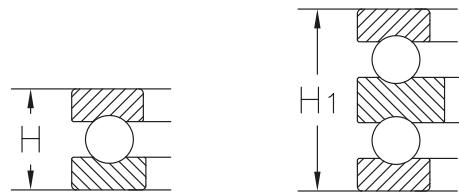
Deviations $\mu\text{m}$		$S_i$ $P_0;P_6;P_5;P_4;P_2$					
$d^*$ mm		$P_0$	$P_6$	$P_5$	$P_4$	$P_2$	$S_e$ $P_0;P_6;P_5;P_4;P_2$
over	up to	max.	max.	max.	max.	max.	max.
-	<b>18</b>	10	5	3	2	1	Identical to $S_i$ for the shaft washer
<b>18</b>	<b>30</b>	10	5	3	2	1,2	
<b>30</b>	<b>50</b>	10	6	3	2	1,5	
<b>50</b>	<b>80</b>	10	7	4	3	2	
<b>80</b>	<b>120</b>	15	8	4	3	2	
<b>120</b>	<b>180</b>	15	9	5	4	3	
<b>180</b>	<b>250</b>	20	10	5	4	3	
<b>250</b>	<b>315</b>	25	13	7	5	4	
<b>315</b>	<b>400</b>	30	15	7	5	4	
<b>400</b>	<b>500</b>	30	18	9	6	-	
<b>500</b>	<b>630</b>	35	21	11	7	-	

\*The values of  $S_i$  and  $S_e$  admitted for double direction thrust bearings are equal to the corresponding values of the single direction thrust bearings and are functions of the bore diameter  $d$ , of the single direction bearings.

### Assembled thrust ball bearings Bearing height

Table 3.34

Deviations $\mu\text{m}$		$\Delta_{H_s}$		$\Delta_{H_1}$	
$d$ mm		high	low	high	low
over	up to				
<b>18</b>	<b>30</b>	+20	-250	+150	-400
<b>30</b>	<b>50</b>	+20	-250	+150	-400
<b>50</b>	<b>80</b>	+20	-300	+150	-500
<b>80</b>	<b>120</b>	+25	-300	+200	-500
<b>120</b>	<b>180</b>	+25	-400	+200	-600
<b>180</b>	<b>250</b>	+30	-400	+250	-600
<b>250</b>	<b>315</b>	+40	-400	+350	-700
<b>315</b>	<b>400</b>	+40	-500	+350	-700
<b>400</b>	<b>500</b>	+50	-500	+400	-900
<b>500</b>	<b>630</b>	+60	-600	+500	-1100



## Mounting chamfer dimensions tolerances

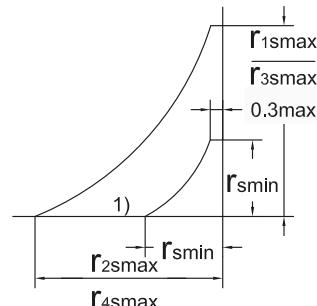
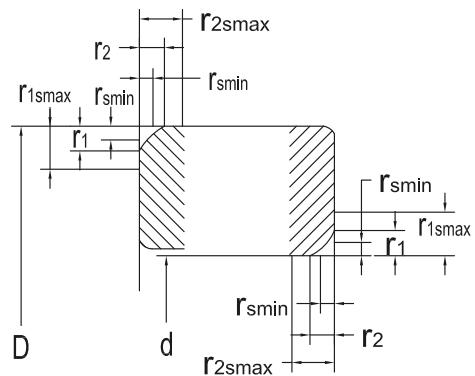
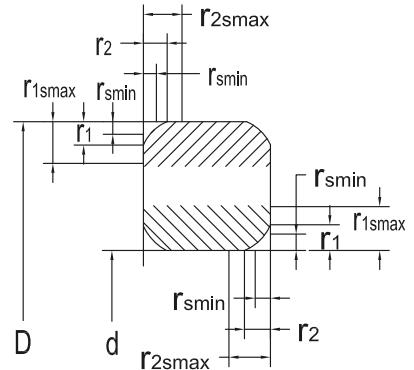
**Symbols:**

$r_1, r_3$  - chamfer dimension in radial direction,  
 $r_2, r_4$  - chamfer dimension in axial direction,  
 $r_s \text{ min}$  - general symbol for minimum limit of  $r_1, r_2, r_3, r_4$ ,  
 $r_{1s} \text{ max}, r_{3s} \text{ max}$  - maximum dimension in radial direction,  
 $r_{2s} \text{ max}, r_{4s} \text{ max}$  - maximum dimension in axial direction.

**Mounting chamfer dimension limits  
for radial and thrust bearings**

Table 3.35

$r_s \text{ min}$	d	Radial bearings		Thrust bearings	
		over	up to	max.	max.
		$r_{1s}, r_{3s}$	$r_{2s}, r_{4s}$	$r_{1s}, r_{3s}$	$r_{2s}, r_{4s}$
<b>0,1</b>	-	-	0,2	0,4	0,2
<b>0,15</b>	-	-	0,3	0,6	0,3
<b>0,2</b>	-	-	0,5	0,8	0,5
<b>0,3</b>	-	40	0,6	1	0,8
	40	-	0,8	1	0,8
<b>0,6</b>	-	40	1	2	1,5
	40	-	1,3	2	1,5
<b>1</b>	-	50	1,5	3	2,2
	50	-	1,9	3	2,2
<b>1,1</b>	-	120	2	3,5	2,7
	120	-	2,5	4	2,7
<b>1,5</b>	-	120	2,3	4	3,5
	120	-	3	5	3,5
<b>2</b>	-	80	3	4,5	4
	220	-	3,8	6	4
	80	220	3,5	5	4
<b>2,1</b>	-	100	3,8	6	4,5
	-	280	4	6,5	4,5
	280	-	4,5	7	4,5
<b>2,5</b>	100	280	4,5	6	-
	280	-	5	7	-
<b>3</b>	-	280	5	8	5,5
	280	-	5,5	8	5,5
<b>4</b>	-	-	6,5	9	6,5
<b>5</b>	-	-	8	10	8
<b>6</b>	-	-	10	13	10
<b>7,5</b>	-	-	12,5	17	12,5

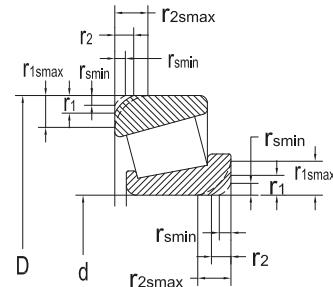


1) Only for  $d < 30$  mm

### Mounting chamfer dimension limits for tapered roller bearings

Table 3.36

Values in mm			
$r_s$ min	d, D	$r_{1s}$ , $r_{3s}$	$r_{2s}$ , $r_{4s}$
		high	low
<b>0,3</b>	-	40	0,7 1,4
	40	-	0,9 1,6
<b>0,6</b>	-	40	1,1 1,7
	40	-	1,3 2
<b>1</b>	-	50	1,6 2,5
	50	-	1,9 3
<b>1,5</b>	-	120	2,3 3
	120	250	2,8 3,5
	250	-	3,5 4
<b>2</b>	-	120	2,8 4
	120	250	3,5 4,5
	250	-	4 5
	250	-	4,5 6
<b>2,5</b>	-	120	3,5 5
	120	250	4 5,5
<b>3</b>	-	120	4 5,5
	120	250	4,5 6,5
	250	400	5 7
	400	-	5,5 7,5
<b>4</b>	-	120	5 7
	120	250	5,5 7,5
	250	400	6 8
	400	-	6,5 8,5
<b>5</b>	-	180	6,5 8
	180	-	7,5 9
<b>6</b>	-	180	7,5 10
	180	-	9 11



### Mounting chamfer dimension limits for tapered roller bearings (inch-metric sizes)

Table 3.37

Values in mm							
Minimum values	Inner ring Nominal bore diameter d	Maximum values	Outer ring Nominal outer diameter D	Maximum			
$r_s$ min		$r_{1s}$ max	$r_{2s}$ max	$r_{3s}$ max	$r_{4s}$ max		
	over up to			over up to			
<b>See bearing tables</b>	- 50,8	50,8 101,6	$r_s$ min+0,4 $r_s$ min+0,5	$r_s$ min+0,9 $r_s$ min+1,3	- 101,6 168,3	$r_s$ min+0,6 $r_s$ min+0,6	$r_s$ min+1,1 $r_s$ min+1,2
	101,6 254	254	$r_s$ min+0,6	$r_s$ min+1,18	168,3 266,7 355,6	266,7 $r_s$ min+0,8 $r_s$ min+1,7	$r_s$ min+1,4 $r_s$ min+1,7
<b>1</b> <b>1,5</b>	254	- 3,5	1,9 4	3 7,5	355,6 355,6	- 3,5	1,9 3
<b>2,5</b> <b>3</b>	254	- 254	4,5 5,5	6 7,5	355,6 355,6	- 5,5	4,5 7,5
<b>3,3</b> <b>3,5</b>	254	- 254	6,5 6,5	9 9	355,6 355,6	- 6,5	6,5 9
<b>6,4</b> <b>8,5</b>	254	- 254	12,5 15	17 19	355,6 355,6	- 15	12,5 17

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



# Bearing applications

## Locating bearings and non-locating bearings

Radial and axial loads in bearing units can be transmitted by locating and non-locating bearings.

A locating bearing is generally used for medium and large-sized shafts that can reach high temperatures during operation. It has to support radially the shaft assembly and to locate it axially in both directions.

A non-locating bearing supports the shaft assembly only radially. It also allows axial displacement in relation to the housing to take place so that additional axial loading is avoided.

Axial displacement can take place either in the housing bore seating or in the bearing itself.

In case the shaft is supported by more than two bearings, only one of them will be a locating bearing and it will be the one with the lightest radial load.

In case of small-sized shaft, two non-locating bearings with limited displacement can be used. Each of them can accommodate axial loads in a single direction, having thus mutual location.

Fig. 4.1 shows a few of the most representative applications of locating and non-locating bearings, as follows:

a) The locating bearing is a single row deep groove ball bearing and the non-locating one is a cylindrical roller bearing with both rings tightly fitted on the shaft and into the housing, respectively.

b) Both bearings are supported by spherical roller bearings. The locating bearing is tightly fitted both on the shaft and into the housing. The non-locating bearing has the outer ring mounted with clearance into the housing and thus allows axial displacement in both directions.

c) The locating bearing consists of a cylindrical roller bearing, NUP type and the non-locating bearing consists of a cylindrical roller bearing, NU type.

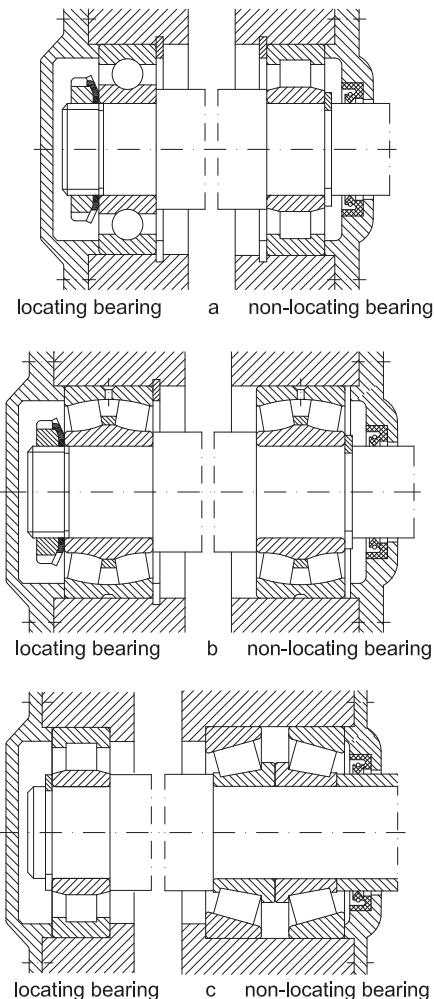


Fig. 4.1

d) The locating bearing consist of a cylindrical roller bearing, NUP type. The non-locating bearing consists of a cylindrical roller bearing, NU type.

e) The locating bearings consists of a cylindrical roller bearing, NU type which takes over radial loads and of a four-point contact ball bearing (unloaded on the outside). The non-locating bearing consists of a cylindrical roller bearing, NU type.

f) The locating bearing consists of a needle roller bearing, NA type which takes over radial loads and of a single row deep groove ball bearing (unloaded on the outside) which takes over axial loads in both directions. The non-locating bearing consists of a needle roller bearing, NA type.

g) The shafts bearings can also be X-type arrangement of two tapererd roller bearings which can be considered mutual located bearing.

## Recommendation for bearing fit selection

Three main criteria have to be considered when selecting the bearing fit:

1. Firm loaction and uniform support of rings
2. Ease of mounting and dismounting
3. Axial displacement of non-locating bearing

The most common location is assured by tight fit. A high tightening is recommended for roller bearings and large- sized bearings in comparasion to ball bearings of the same size.

In case of a tight fit, the inner ring is supported by the entire shaft contact surface, thus bearing is used at full load carrying capacity.

The tolerance classes given in table 4.1 and 4.3 are available for bearing fits which do not exceed +120°C during operation.

As a general rule, the selection of the tolerance class "H" is recommended for bearings of separable design and tolerance class "J" for bearings of non-separable design.

When selecting a fit, the load of rotating ring has to consider, namely:

- If the inner ring rotates and the load is stationary, the outer ring should be mounted with clearance fit.
- If the inner ring rotates and the load is stationary, the outer ring should be mounted with tight fit.
- If the inner ring rotates and the direction of load is not determined, both rings should be mounted with tight fit.

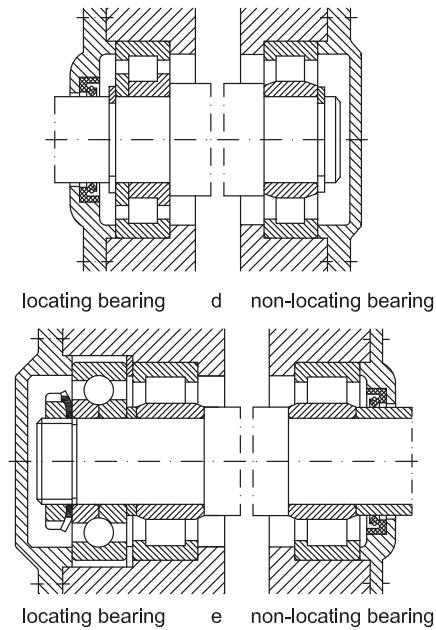
In table 4.1, there are given recommendations to select the tolerance class for shaft as function of: bearing type, loading and shaft diameter. In table 4.3, one can find recommendations to select the tolerance class for housing.

Figure 4.2 shows schematically the tolerance classes for shaft and housing and their influence over fit type i.e. clearance, transition or tight fit for housing and transition fit or tight fit for shaft, respectively.

In tables 4.2 and 4.4, the deviations of the shaft diameter (4.2) and of the housing diameter (4.4) are given, considering the following:

- upper and lower limits
- theoretical minimum and maximum values of tightening (+) or clearance (-) in the fit
- the minimum and maximum values of the probable tightening or clearance in the fit (99% of fits are between these limits).

The tolerances of bore diameter  $d_{mp}$  and outside diameter  $D_{mp}$  are valid for all metric sized bearings, except tapered roller bearings with  $d < 30$  mm and  $D < 150$  mm and thrust ball bearings with  $D \leq 150$  mm, (see table 3.15 and 3.16 on page 35 and table 3.31 and 3.32 on page 41)



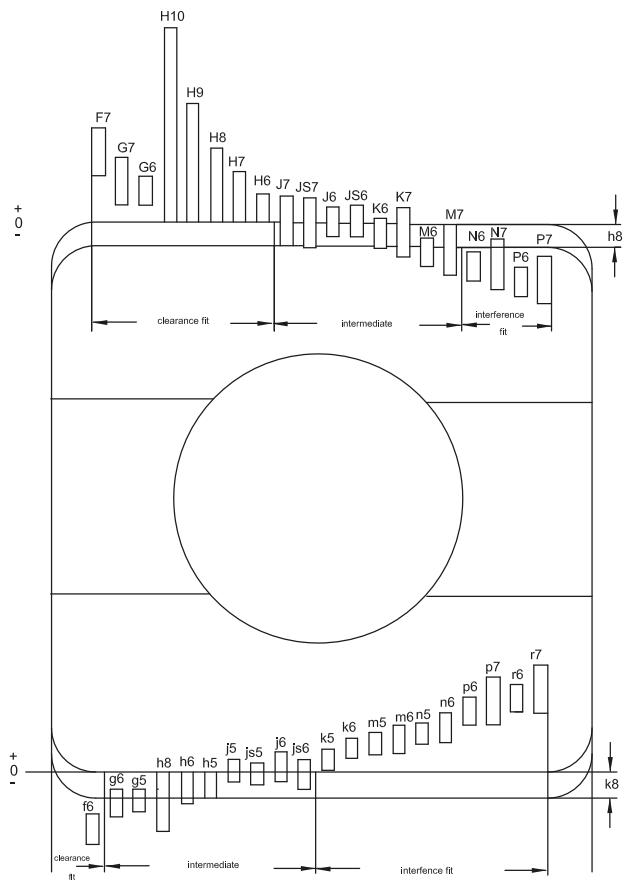
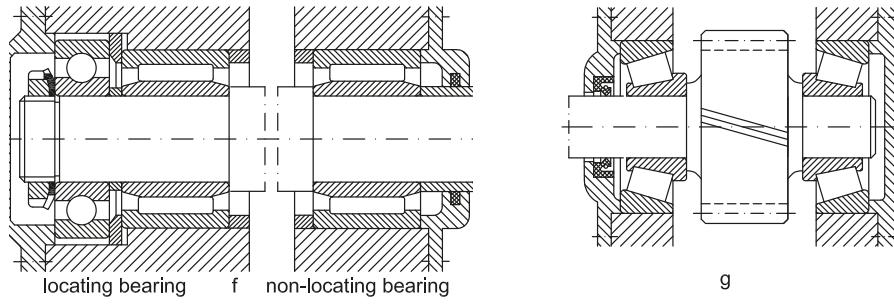


Fig.4.2

## Bearing application

### Tolerance classes for shafts

Operating conditions		Examples	Shaft diameter (mm)			Table 4.1
			Ball bearings	Cylindrical, needle and tapered roller bearings	Spherical roller bearings	Tolerance class symbol
Radial bearings with cylindrical core <b>Stationary inner ring load</b>						
Easy axial displacement of inner ring on shaft desirable	Wheels on non-rotating shafts (free wheels)	All diameters				g6(f6)
Axial displacement of inner ring on shaft not necessary	Tension pulleys, sheaves					h6
<b>Rotating inner ring load</b>						
Light and variable loads ( $P < 0,06C$ )	Conveyors lightly loaded mechanisms, bearings	18...100 >100...140	≤40 >40...100	- -	-	j6 k6
Normal and heavy loads ( $P > 0,06C$ )	General mechanical engineering, electric motors, turbines, pumps, gearboxes, woodworking machines	≤18 >18...100 >100...140 >140...200 >200...280 - - -	- ≤40 >40...100 >100...140 >140...200 >200...400 - - -	≤40 ≥40...65 >65...100 >100...140 >140...280 >280...500 >500	- - - - - - -	j5 k5(k6) m5(m6) m6 n6 p6 r6 r7
Heavy loads and shock loads, arduous working conditions ( $P > 0,12C$ )	Heavy duty railway vehicles axle bearings, traction motors, rolling mills	- - - 200	>50...140 >140...200 - 200	>50...100 >100...200 - >200	- - - -	n6 p6 r6
High running accuracy, light loads ( $P < 0,06C$ )	Machine tools	≤18 >18...100 >100...200 -	- ≤40 >40...100 >140...200	- - - -	- - - -	h5 j5 k5 m5
<b>Axial loads</b>						
All kind of bearing application		≤250 >250	≤250 >250	<250 >250	-	j6 js6

## Bearing application

### Tolerance classes for shafts

Operating conditions	Examples	Shaft diameter (mm)			Table 4.1 (continue)
		Ball bearings	Cylindrical, needle and tapered roller bearings	Spherical roller bearings	
<b>Tapered bore bearings with withdrawal or adapter sleeve</b>	Axle shaft for railway vehicles General mechanical engineering	All diameters			h9 h10
<b>Thrust bearings Axial loads</b>	Thrust ball bearings Cylindrical and needle roller thrust bearings Cylindrical, needle roller and cage thrust assembly	All sizes All sizes All sizes			h6 h6(h8) h8
<b>Combined loads on spherical roller trust bearings</b>	Stationary load on shaft washer  Rotating load on shaft washer or indeterminate load direction	≤250 >250  ≤200 >200...400 >400			j6 js6  k6 m6 n8

## Bearing application

### Shaft fits

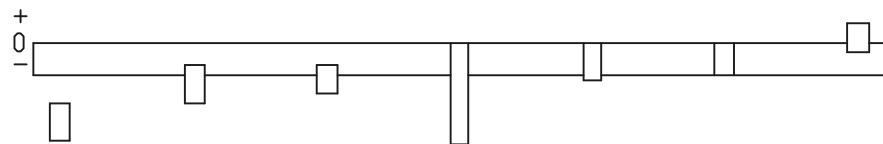


Table 4.2

Shaft Diameter nominal d	Bearing Bore diameter tolerance $\Delta_{\text{dmp}}$	Deviations of shaft diameter, resultant fits															
		Tolerances															
		f6	g6	g5	h8	h6	h5	j5	over	up to	low	high					
mm $\mu\text{m}$																	
1	3	-8	0	a) -6	-12	-2	-8	-2	-6	0	-14	0	-6	0	-4	+2	-2
				b) +2	-12	+6	-8	+6	-6	+8	-14	+8	-6	+8	-4	+10	-0
				c) 0	-10	+4	-6	+5	-5	+6	-12	+6	-4	+7	-3	+9	-1
3	6	-8	0	-10	-18	-4	-12	-4	-9	0	-18	0	-8	0	-5	+3	-2
				-2	-18	+4	-12	+4	-9	+8	-18	+8	-8	+8	-5	+11	-2
				-4	-16	+2	-10	+3	-8	+5	-15	+6	-6	+7	-4	+10	-1
6	10	-8	0	-13	-22	-5	-14	-5	-11	0	-22	0	-9	0	-6	+4	-2
				-5	-22	+3	-14	+3	-11	+8	-22	+8	-9	+8	-6	+12	-2
				-7	-20	+1	-12	+1	-9	+5	-19	+6	-7	+6	-4	+10	0
10	18	-8	0	-16	-27	-6	-17	-6	-14	0	-27	0	-11	0	-8	+5	-3
				-8	-27	+2	-17	+2	-14	+8	-27	+8	-11	+8	-8	+13	-3
				-10	-25	0	-15	0	-12	+5	-24	+6	-9	+6	-6	+11	-1
18	30	-10	0	-20	-33	-7	-20	-7	-16	0	-33	0	-13	0	-9	+5	-4
				-10	-33	+3	-20	+3	-16	+10	-33	+10	-13	+10	-9	+15	-4
				-13	-30	0	-17	+1	-14	+6	-29	+7	-10	+8	-7	+13	-2
30	50	-12	0	-25	-41	-9	-25	-9	-20	0	-39	0	-16	0	-11	+6	-5
				-13	-41	+3	-25	+3	-20	+12	-39	+12	-16	+12	-11	+18	-5
				-17	-37	-1	-21	0	-17	+7	-34	+8	-12	+9	-8	+15	-2
50	80	-15	0	-30	-49	-10	-29	-10	-23	0	-46	0	-19	0	-13	+6	-7
				-15	-49	+5	-29	+5	-23	+15	-46	+15	-19	+15	-13	+21	-7
				-19	-45	+1	-25	+1	-19	+9	-40	+11	-15	+11	-9	+17	-3
80	120	-20	0	-36	-58	-12	-34	-12	-27	0	-54	0	-22	0	-15	+6	-9
				-16	-58	+8	-34	+8	-27	+20	-54	+20	-22	+20	-15	+26	-9
				-22	-52	+2	-28	+3	-22	+12	-46	+14	-16	+15	-10	+21	-4
120	180	-25	0	-43	-68	-14	-39	-14	-32	0	-63	0	-25	0	-18	+7	-11
				-18	-68	+11	-39	+11	-32	+25	-63	+25	-25	+25	-18	+32	-11
				-25	-61	+4	-32	+5	-26	+15	-53	+18	-18	+19	-12	+26	-5
180	250	-30	0	-50	-79	-15	-44	-15	-35	0	-72	0	-29	0	-20	+7	-13
				-20	-79	+15	-44	+15	-35	+30	-72	+30	-29	+30	-20	+37	-13
				-28	-71	+7	-36	+9	-29	+18	-60	+22	-21	+24	-14	+31	-7
250	315	-35	0	-56	-88	-17	-49	-17	-40	0	-81	0	-32	0	-23	+7	-16
				-21	-88	+18	-49	+18	-40	+35	-81	+35	-32	+35	-23	+42	-16
				-30	-79	+9	-40	+10	-32	+22	-68	+26	-23	+27	-15	+34	-8
315	400	-40	0	-62	-98	-18	-54	-18	-43	0	-89	0	-36	0	-25	+7	-18
				-22	-98	+22	-54	+22	-43	+40	-89	+40	-36	+40	-25	+47	-18
				-33	-87	+11	-43	+14	-35	+25	-74	+29	-25	+32	-17	+39	-10

## Bearing application

### Shaft fits

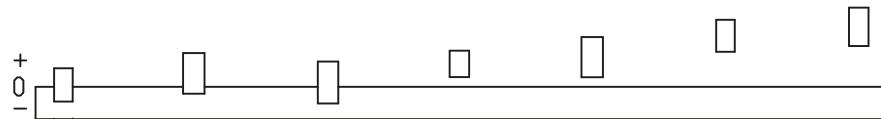


Table 4.2 (continued)

Shaft Diameter	Bearing Bore diameter	Deviations of shaft diameter, resultant fits															
		nominal tolerance $d$	$\Delta_{\text{dmp}}$	js5		j6		js6		k5		k6		m5		m6	
				a) Deviations (shaft diameter)	b) Tightening/Theoretical clearance	c) Tightening/Probable clearance	over	up to	low	high	over	up to	low	high	over	up to	low
mm		$\mu\text{m}$															
1	3	-8	0	a) +2	-2	+4	-2	+3	-3	+4	0	+6	0	+6	+2	+8	+2
				b) +10	-2	+12	-2	+11	-3	+12	0	+14	0	+14	+2	+16	+2
				c) +9	-1	+10	0	+9	-1	+11	+1	+12	+2	+13	+3	+14	+4
3	6	-8	0	+2,5	-2,5	+6	-2	+4	-4	+6	+1	+9	+1	+9	+4	+12	+4
				+10,5	-2,5	+14	-2	+12	-4	+14	+1	+17	+1	+17	+4	+20	+4
				+9	-1	+12	0	+10	-2	+13	+2	+15	+3	+16	+5	+18	+6
6	10	-8	0	+3	-3	+7	-2	+4,5	-4,5	+7	+1	+10	+1	+12	+6	+15	+6
				+11	-3	+15	-2	+12,5	-4,5	+15	+1	+18	+1	+20	+6	+23	+6
				+9	-1	+13	0	+11	-3	+13	+3	+16	+3	+18	+8	+21	+8
10	18	-8	0	+4	-4	+8	-3	+5,5	-5,5	+9	+1	+12	+1	+15	+7	+18	+7
				+12	-4	+16	-3	+13,5	-5,5	+17	+1	+20	+1	+23	+7	+26	+7
				+10	-2	+14	-1	+11	-3	+15	+3	+18	+3	+21	+9	+24	+9
18	30	-10	0	+4,5	-4,5	+9	-4	+6,5	-6,5	+11	+2	+15	+2	+17	+8	+21	+8
				+14,5	-4,5	+19	-4	+16,5	-6,5	+21	+2	+25	+2	+27	+8	+31	+8
				+12	-2	+16	-1	+14	-4	+19	+4	+22	+5	+25	+10	+28	+11
30	50	-12	0	+5,5	-5,5	+11	-5	+8	-8	+13	+2	+18	+2	+20	+9	+25	+9
				+17,5	-5,5	+23	-5	+20	-8	+25	+2	+30	+2	+32	+9	+37	+9
				+15	-3	+19	-1	+16	-4	+22	+5	+26	+6	+29	+12	+33	+13
50	80	-15	0	+6,5	-6,5	+12	-7	+9,5	-9,5	+15	+2	+21	+2	+24	+11	+30	+11
				+21,5	-6,5	+27	-7	+24,5	-9,5	+30	+2	+36	+2	+39	+11	+45	+11
				+18	-3	+23	-3	+20	-5	+26	+6	+32	+6	+35	+15	+41	+15
80	120	-20	0	+7,5	-7,5	+13	-9	+11	-11	+18	+3	+25	+3	+28	+13	+35	+13
				+27,5	-7,5	+33	-9	+31	-11	+38	+3	+45	+3	+48	+13	+55	+13
				+23	-3	+27	-3	+25	-5	+33	+8	+39	+9	+43	+18	+49	+19
120	180	-25	0	+9	-9	+14	-11	+12,5	-12,5	+21	+3	+28	+3	+33	+15	+40	+15
				+34	-9	+39	-11	+37,5	-12,5	+46	+3	+53	+3	+58	+15	+65	+15
				+28	-3	+32	-4	+31	-6	+40	+9	+46	+10	+52	+21	+58	+22
180	250	-30	0	+10	-10	+16	-13	+14,5	-14,5	+24	+4	+33	+4	+37	+17	+46	+17
				+40	-10	+46	-13	+44,5	-14,5	+54	+4	+63	+4	+67	+17	+76	+17
				+34	-4	+38	-5	+36	-6	+48	+10	+55	+12	+61	+23	+68	+25
250	315	-35	0	+11,5	-11,5	+16	-16	+16	-16	+27	+4	+36	+4	+43	+20	+52	+20
				+46,5	-11,5	+51	-16	+51	-16	+62	+4	+71	+4	+78	+20	+87	+20
				+39	-4	+42	-7	+42	-7	+54	+12	+62	+13	+70	+28	+78	+29
315	400	-40	0	+12,5	-12,5	+18	-18	+18	-18	+29	+4	+40	+4	+46	+21	+57	+21
				+52,5	-12,5	+58	-18	+58	-18	+69	+4	+80	+4	+86	+21	+97	+21
				+44	-4	+47	-7	+47	-7	+61	+12	+69	+15	+78	+29	+86	+32

## Bearing application

### Shaft fits

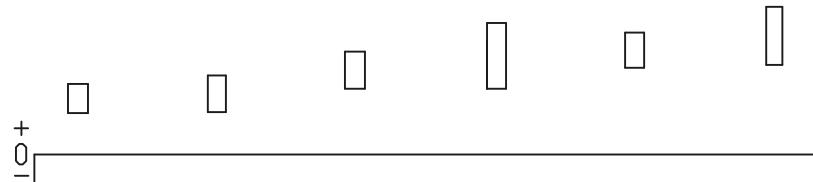


Table 4.2 (continued)

Shaft Diameter nominal d	Bearing Bore diameter tolerance $\Delta_{\text{dmp}}$	Deviations of shaft diameter, resultant fits													
		Tolerances													
		n5	n6	p6	p7	r6	r7								
a) Deviations (shaft diameter) b) Tightening/Theoretical clearance c) Tightening/Probable clearance															
mm	μm														
1	3	-8	0	a) +8	+4	+10	+4	+12	+6	+16	+6	+16	+10	+20	+10
				b) +16	+4	+18	+4	+20	+6	+24	+6	+24	+10	+28	+10
				c) +15	+5	+16	+6	+18	+8	+22	+8	+22	+12	+26	+12
3	6	-8	0	+13	+8	+16	+8	+20	+12	+24	+12	+23	+15	+27	+15
				+21	+8	+24	+8	+28	+12	+32	+12	+31	+15	+35	+15
				+20	+9	+22	+10	+26	+14	+30	+14	+29	+17	+33	+17
6	10	-8	0	+16	+10	+19	+10	+24	+15	+30	+15	+28	+19	+34	+19
				+24	+10	+27	+10	+32	+15	+38	+15	+36	+19	+42	+19
				+22	+12	+25	+12	+30	+17	+35	+18	+34	+21	+39	+22
10	18	-8	0	+20	+12	+23	12	+29	+18	+36	+18	+34	+23	+41	+23
				+28	+12	+31	+12	+37	+18	+44	+18	+42	+23	+49	+23
				+26	+14	+29	+14	+35	+20	+41	+21	+40	+25	+46	+26
18	30	-10	0	+24	+15	+28	+15	+35	+22	+43	+22	+41	+28	+49	+28
				+34	+15	+38	+15	+45	+22	+53	+22	+51	+28	+59	+28
				+32	+17	+35	+18	+42	+25	+50	+25	+48	+31	+56	+31
30	50	-12	0	+28	+17	+33	+17	+42	+26	+51	+26	+50	+34	+59	+34
				+40	+17	+45	+17	+54	+26	+63	+26	+62	+34	+71	+34
				+37	+20	+41	+21	+50	+30	+59	+30	+58	+38	+67	+38
50	65	-15	0	+33	+20	+39	+20	+51	+32	+62	+32	+60	+41	+71	+41
				+48	+20	+54	+20	+66	+32	+77	+32	+75	+41	+86	+41
				+44	+24	+50	+24	+62	+36	+72	+37	+71	+45	+81	+46
65	80	-15	0	+33	+20	+39	+20	+51	+32	+62	+32	+62	+43	+73	+43
				+48	+20	+54	+20	+66	+32	+77	+32	+77	+43	+88	+43
				+44	+24	+50	+24	+62	+36	+72	+37	+73	+47	+83	+48
80	100	-20	0	+38	+23	+45	+23	+59	+37	+72	+37	+73	+51	+86	+51
				+58	+23	+65	+23	+79	+37	+92	+37	+93	+51	+106	+51
				+53	+28	+59	+29	+73	+43	+85	+44	+87	+57	+99	+58
100	120	-20	0	+38	+23	+45	+23	+59	+37	+72	+37	+76	+54	+89	+54
				+58	+23	+65	+23	+79	+37	+92	+37	+96	+54	+109	+54
				+53	+28	+59	+29	+73	+43	+85	+44	+90	+60	+102	+61
120	140	-25	0	+45	+27	+52	+27	+68	+43	+83	+43	+88	+63	+103	+63
				+70	+27	+77	+27	+93	+43	+108	+43	+113	+63	+128	+63
				+64	+33	+70	+34	+86	+50	+100	+51	+106	+70	+120	+71
140	160	-25	0	+45	+27	+52	+27	+68	+43	+83	+43	+90	+65	+105	+65
				+70	+27	+77	+27	+93	+43	+108	+43	+115	+65	+130	+65
				+64	+33	+70	+34	+86	+50	+100	+51	+108	+72	+122	+73
160	180	-25	0	+45	+27	+52	+27	+68	+43	+83	+43	+93	+68	+108	+68
				+70	+27	+77	+27	+93	+43	+108	+43	+118	+68	+133	+68
				+64	+33	+70	+34	+86	+50	+100	+51	+111	+75	+125	+76

## Bearing application

### Shaft fits

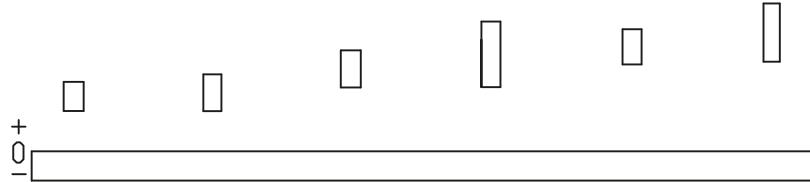


Table 4.2 (continued)

Shaft Diameter nominal d	Bearing Bore diameter tolerance $\Delta_{\text{dmp}}$	Deviations of shaft diameter, resultant fits																		
		Tolerances																		
		n5	n6	p6	p7	r6	r7													
a) Deviations (shaft diameter) b) Tightening/Theoretical clearance c) Tightening/Probable clearance																				
		over	up to	low	high															
		mm		μm																
180	200	-30	0	a) +51	+31	+60	+31	+79	+50	+96	+50	+106	+77	+123	+77					
				b) +81	+31	+90	+31	+109	+50	+126	+50	+136	+77	+153	+77					
				c) +75	+37	+82	+39	+101	+58	+116	+60	+128	+85	+143	+87					
200	225	-30	0	+51	+31	+60	+31	+79	+50	+96	+50	+109	+80	+126	+80					
				+81	+31	+90	+31	+109	+50	+126	+50	+139	+80	+156	+80					
				+75	+37	+82	+39	+101	+58	+116	+60	+131	+88	+146	+90					
225	250	-30	0	+51	+31	+60	+31	+79	+50	+96	+50	+113	+84	+130	+84					
				+81	+31	+90	+31	+109	+50	+126	+50	+143	+84	+160	+84					
				+75	+37	+82	+39	+101	+58	+116	+60	+135	+92	+150	+94					
250	280	-35	0	+57	+34	+66	+34	+88	+56	+108	+56	+126	+94	+146	+94					
				+92	+34	+101	+34	+123	+56	+143	+56	+161	+94	+181	+94					
				+84	+42	+92	+43	+114	+65	+131	+68	+152	+103	+169	+106					
280	315	-35	0	+57	+34	+66	+34	+88	+56	+108	+56	+130	+98	+150	+98					
				+92	+34	+101	+34	+123	+56	+143	+56	+165	+98	+185	+98					
				+84	+42	+92	+43	+114	+65	+131	+68	+156	+107	+173	+110					
315	355	-40	0	+62	+37	+73	+37	+98	+62	+119	+62	+144	+108	+165	+108					
				+102	+37	+113	+37	+138	+62	+159	+62	+184	+108	+205	+108					
				+94	+45	+102	+48	+127	+73	+146	+75	+173	+119	+192	+121					
355	400	-40	0	+62	+37	+73	+37	+98	+62	+119	+62	+150	+114	+171	+114					
				+102	+37	+113	+37	+138	+62	+159	+62	+190	+114	+211	+114					
				+94	+45	+102	+48	+127	+73	+146	+75	+179	+125	+198	+127					

## Bearing application

### Tolerance classes for housing bores

#### Radial bearings

Solid housing Operating conditions	Examples	Tolerance class symbol	Outer ring displacement	Table 4.3
<b>Rotating outer ring load</b>				
Heavy loads on bearings in thin-walled housings, heavy shock loads ( $P > 0,12C$ )	Roller bearing wheel hubs, connecting rod bearing	P7	Outer ring cannot be displaced	
Normal and heavy loads ( $P > 0,06C$ )	Ball bearing wheel hubs, connecting rod bearings, crane traveling wheels	N7		
Light and variable loads ( $P \leq 0,06C$ )	Conveyer rollers, rope sheaves, belt tension pulleys	M7		
<b>Direction of load indeterminate</b>				
Heavy shock loads	Traction motors	M7	Outer ring cannot be displaced	
Normal and heavy loads ( $P > 0,06C$ ). Outer ring displacement is not necessary	Electric motors, pumps crankshaft main bearings	K7		

Split or solid housing Operating conditions	Examples	Tolerance class symbol	Outer ring displacement
<b>Direction of load indeterminate</b>			
Light and normal loads Desirable outer ring displacement ( $P \leq 0,12 C$ )	Medium-sized electric motors, pumps, crankshaft main bearings	J7	The outer ring can be displaced
<b>Stationary outer ring load</b>			
Loads of all kinds	General mechanical engineering, railway axleboxes	H7	The outer ring can be easily displaced
Light and normal loads with simple conditions ( $P \leq 0,12C$ )		H8	
Heat conduction through shaft	Drying cylinders, large electrical machines with spherical roller bearings	G7	

## Bearing application

### Tolerance classes for housing bores

#### Radial bearings

Split housing Operating conditions	Examples	Tolerance class symbol	Outer ring displacement	Table 4.3 (continued)
<b>High accuracy rotation, quiet running</b>				
High shiftiness at variable loads	Main shafts for machine-tools with roller bearings	D≤125 D>125	M6 N6	The outer ring cannot be displaced
Light loads, indeterminate load direction	Shaft operating surface for grinding machines with ball bearing, free bearing for high speed superchargers	K6		The outer ring cannot be displaced
Desirable outer ring displacement	Shaft operating surface for grinding machines with ball bearings, free bearing for high speed superchargers	J6		The outer ring can be displaced
Quiet running	Small-sized electrical machines	H6		The outer ring can be easily displaced

### Tolerance classes for housing bores

#### Thrust bearings

Thrust bearings Operating conditions	Tolerance class symbol	Remarks
<b>Axial load</b>		
Thrust ball bearings Cylindrical and needle roller thrust bearings	H8 H7 (H9)	For less accurate bearing arrangements, radial clearance in housing can be up to 0,001 D
<b>Combined loads on spherical roller thrust bearings</b>		
Local load on housing washer Peripheral load on housing washer	H7(H9) M7	
<b>Axial or combined load on spherical roller thrust bearings</b>		
Bearing radial location is ensured by another bearing	-	Housing washer fitted with clearance up to 0,001 D

## Bearing application

### Housing fits

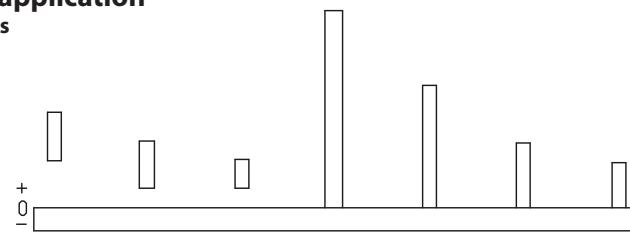


Table 4.4

Housing Diameter				Bearing Outside diameter tolerance		Deviations of housing bore diameter, resultant fits												
				$\Delta_{D_{mp}}$		F7	G7	G6	H10	H9	H8	H7						
nominal D				over up to low high		a) Deviations (housing bore diameter) b) Tightening/Theoretical clearance c) Tightening/Probable clearance												
mm	mm	μm	μm															
6	10	0	-8	a)	+13	+28	+5	+20	+5	+14	0	+58	0	+36	0	+22	0	+15
				b)	-13	-36	-5	-28	-5	-22	0	-66	0	-44	0	-30	0	-23
				c)	-16	-33	-8	-25	-7	-20	-3	-63	-3	-41	-3	-27	-3	-20
10	18	0	-8		+16	+34	+6	+24	+6	+17	0	+70	0	+43	0	+27	0	+18
					-16	-42	-6	-32	-6	-25	0	-78	0	-51	0	-35	0	-26
					-19	-39	-9	-29	-8	-23	-3	-75	-3	-48	-3	-32	-3	-23
18	30	0	-9		+20	+41	+7	+28	+7	+20	0	+84	0	+52	0	+33	0	+21
					-20	-50	-7	-37	-7	-29	0	-93	0	-61	0	-42	0	-30
					-23	-47	-10	-34	-10	-26	-4	-89	-4	-57	-3	-39	-3	-27
30	50	0	-11		+25	+50	-9	+34	+9	+25	0	+100	0	+62	0	+39	0	+25
					-25	-61	-9	-45	-9	-36	0	-111	0	-73	0	-50	0	-36
					-29	-57	-13	-41	-12	-33	-5	-106	-5	-68	-4	-46	-4	-32
50	80	0	-13		+30	+60	+10	+40	+10	+29	0	+120	0	+74	0	+46	0	+30
					-30	-73	-10	-53	-10	-42	0	-133	0	-87	0	-59	0	-43
					-35	-68	-15	-48	-14	-38	-6	-127	-5	-82	-5	-54	-5	-38
80	120	0	-15		+36	+71	+12	+47	+12	+34	0	+140	0	+87	0	+54	0	+35
					-36	-86	-12	-62	-12	-49	0	-155	0	-102	0	-69	0	-50
					-41	-81	-17	-57	-17	-44	-7	-148	-6	-96	-6	-63	-5	-45
120	150	0	-18		+43	+83	+14	+54	+14	+39	0	+160	0	+100	0	+63	0	+40
					-43	-101	-14	-72	-14	-57	0	-178	0	-118	0	-81	0	-58
					-50	-94	-21	-65	-20	-51	-8	-170	-8	-110	-7	-74	-7	-51
150	180	0	-25		+43	+83	+14	+54	+14	+39	0	+160	0	+100	0	+63	0	+40
					-43	-108	-14	-79	-14	-64	0	-185	0	-125	0	+88	0	-65
					-51	-100	-22	-71	-21	-57	-11	-174	-10	-115	-10	-78	-8	-57
180	250	0	-30		+50	+96	+15	+61	+15	+44	0	+185	0	+115	0	+72	0	+46
					-50	-126	-15	-91	-15	-74	0	-215	0	-145	0	-102	0	-76
					-60	-116	-25	-81	-23	-66	-13	-202	-13	-132	-12	-90	-10	-66
250	315	0	-35		+56	+108	-17	+69	+17	+49	0	+210	0	+130	0	+81	0	+52
					-56	-143	-17	-104	-17	-84	0	-245	0	-165	0	-116	0	-87
					-68	-131	-29	-92	-26	-75	-16	-229	-15	-150	-13	-103	-12	-75
315	400	0	-40		+62	+119	+18	+75	+18	+54	0	+230	0	+140	0	+89	0	+57
					-62	-159	-18	-115	-18	-94	0	-270	0	-180	0	-129	0	-97
					-75	-146	-31	-102	-29	-83	-18	-252	-17	-163	-15	-114	-13	-84
400	500	0	-45		+68	+131	+20	+83	+20	+60	0	+250	0	+155	0	+97	0	+63
					-68	-176	-20	-128	-20	-105	0	-295	0	-200	0	-142	0	-108
					-83	-161	-35	-113	-32	-93	-20	-275	-19	-181	-17	-125	-15	-93

## Bearing application

### Housing fits

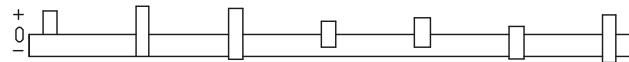


Table 4.4 (continued)

Housing Diameter				Bearing Outside diameter		Deviations of housing bore diameter, resultant fits												
				nominal tolerance		Tolerances												
D	$\Delta_{Dmp}$	H6	J7	JS7	J6	JS6	K6	K7										
a) Deviations (housing bore diameter)																		
over				up to		low		high										
mm				μm														
<b>6</b>	<b>10</b>	<b>0</b>	<b>-8</b>	a) 0	+9	-7	+8	-7,5	+7,5	-4	+5	-4,5	+4,5	-7	+2	-10	+5	
				b) 0	-17	+7	-16	+7,5	-15,5	+4	-13	+4,5	-12,5	+7	-10	+10	-13	
				c) -2	-15	+4	-13	+5	-13	+2	-11	+3	-11	+5	-8	+7	-10	
<b>10</b>	<b>18</b>	<b>0</b>	<b>-8</b>	0	+11	-8	+10	-9	+9	-5	+6	-5,5	+5,5	-9	+2	-12	+6	
				0	-19	+8	-18	+9	-17	+5	-14	+5,5	-13,5	+9	-10	+12	-14	
				-2	-17	+5	-15	+6	-14	+3	-12	+3	-11	+7	-8	+9	-11	
<b>18</b>	<b>30</b>	<b>0</b>	<b>-9</b>	0	+13	-9	+12	-10,5	+10,5	-5	+8	-6,5	+6,5	-11	+2	-15	+6	
				0	-22	+9	-21	+10,5	-19,5	+5	-17	+6,5	-15,5	+11	-11	+15	-15	
				-3	-19	+6	-18	+7	-16	+2	-14	+4	-13	+8	-8	+12	-12	
<b>30</b>	<b>50</b>	<b>0</b>	<b>-11</b>	0	+16	-11	+14	-12,5	+12,5	-6	+10	-8	+8	-13	+3	-18	+7	
				0	-27	+11	-25	+12,5	-23,5	+6	-21	+8	-19	+13	-14	+18	-18	
				-3	-24	+7	-21	+9	-20	+3	-18	+5	-16	+10	-11	+14	-14	
<b>50</b>	<b>80</b>	<b>0</b>	<b>-13</b>	0	+19	-12	+18	-15	+15	-6	+13	-9,5	+9,5	-15	+4	-21	+9	
				0	-32	+12	-31	+15	-28	+6	-26	+9,5	-22,5	+15	-17	+21	-22	
				-4	-28	+7	-26	+10	-23	+2	-22	+6	-19	+11	-13	+16	-17	
<b>80</b>	<b>120</b>	<b>0</b>	<b>-15</b>	0	+22	-13	+22	-17,5	+17,5	-6	+16	-11	+11	-18	+4	-25	+10	
				0	-37	+13	-37	+17,5	-32,5	+6	-31	+11	-26	+18	-19	+25	-25	
				-5	-32	+8	-32	+12	-27	+1	-26	+6	-21	+13	-14	+20	-20	
<b>120</b>	<b>150</b>	<b>0</b>	<b>-18</b>	0	+25	-14	+26	-20	+20	-7	+18	-12,5	+12,5	-21	+4	-28	+12	
				0	-43	+14	-44	+20	-38	+7	-36	+12,5	-30,5	+21	-22	+28	-30	
				-6	-37	+7	-37	+13	-31	+1	-30	+7	-25	+15	-16	+21	-23	
<b>150</b>	<b>180</b>	<b>0</b>	<b>-25</b>	0	+25	-14	+26	-20	+20	-7	+18	-12,5	+12,5	-21	+4	-28	+12	
				0	-50	+14	-51	+20	-45	+7	-43	+2,5	-37,5	+21	-29	+28	-37	
				-7	-43	+6	-43	+12	-37	0	-36	+6	-31	+14	-22	+20	-29	
<b>180</b>	<b>250</b>	<b>0</b>	<b>-30</b>	0	+29	-16	+30	-23	+23	-7	+22	-14,5	+14,5	-24	+5	-33	+13	
				0	-59	+16	-60	+23	-53	+7	-52	+14,5	-44,5	+24	-35	+33	-43	
				-8	-51	+6	-50	+13	-43	-1	-44	+6	-36	+16	-27	+23	-33	
<b>250</b>	<b>315</b>	<b>0</b>	<b>-35</b>	0	+32	-16	+36	-26	+26	-7	+25	-16	+16	-27	+5	-36	+16	
				0	-67	+16	-71	+26	-61	+7	-60	+16	+51	+27	-40	+36	-51	
				-9	-58	+4	-59	+14	-49	-2	-51	+7	-42	+18	-31	+24	-39	
<b>315</b>	<b>400</b>	<b>0</b>	<b>-40</b>	0	+36	-18	+39	-28,5	+28,5	-7	+29	-18	+18	-29	+7	-40	+17	
				0	-76	+18	-79	+28,5	-68,5	+7	-69	+18	-58	+29	-47	+40	-57	
				-11	-65	+5	-66	+15	-55	-4	-58	+7	-47	+18	-36	+27	-44	
<b>400</b>	<b>500</b>	<b>0</b>	<b>-45</b>	0	+40	-20	+43	-31,5	+31,5	-7	+33	-20	+20	-32	+8	-45	+18	
				0	-85	+20	-88	+31,5	-76,5	+7	-78	+20	-65	+32	-53	+45	-63	
				-12	-73	+5	-73	+17	-62	-5	-66	+8	-53	+20	-41	+30	-48	

## Bearing application

### Housing fits

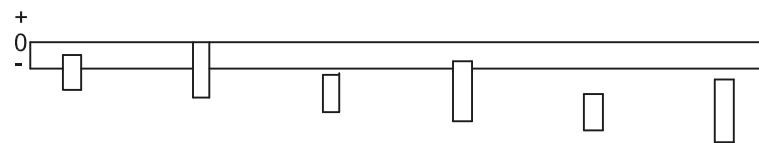
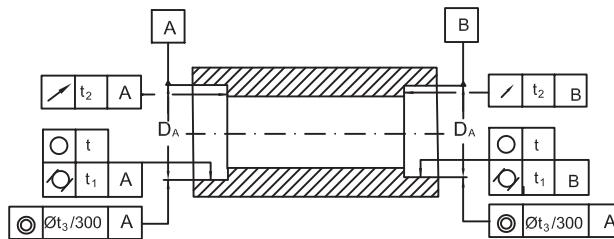
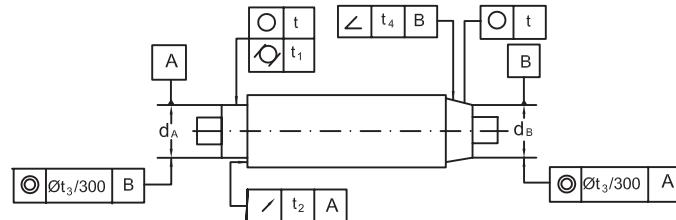


Table 4.4 (continued)

Housing Diameter				Bearing Outside diameter		Deviations of housing bore diameter, resultant fits										
				nominal tolerance $\Delta_{Dmp}$		M6	M7	N6	N7	P6	P7					
				a) Deviations (housing bore diameter) b) Tightening/Theoretical clearance c) Tightening/Probable clearance												
mm	mm	μm	μm	over	up to	low	high									
6	10	0	-8	a)	-12	-3	-15	0	-16	-7	-19	-4	-21	-12	-24	-9
				b)	+12	-5	+15	-8	+16	-1	+19	-4	+21	+4	+24	+1
				c)	+10	-3	+12	-5	+14	+1	+16	-1	+19	+6	+21	+4
10	18	0	-8		-15	-4	-18	0	-20	-9	-23	-5	-26	-15	-29	-11
					+15	-4	+18	-8	+20	+1	+23	-3	+26	+7	+29	+3
					+13	-2	+15	-5	+18	+3	+20	0	+24	+9	+26	+6
18	30	0	-9		-17	-4	-21	0	-24	-11	-28	-7	-31	-18	-35	-14
					+17	-5	+21	-9	+24	+2	+28	-2	+31	+9	+35	+5
					+14	-2	+18	-6	+21	+5	+25	+1	+28	+12	+32	+8
30	50	0	-11		-20	-4	-25	0	-28	-12	-33	-8	-37	-21	-42	-17
					+20	-7	+25	-11	+28	+1	+33	-3	+37	+10	+42	+6
					+17	-4	+21	-7	+25	+4	+29	+1	+34	+13	+38	+10
50	80	0	-13		-24	-5	-30	0	-33	-14	-39	-9	-45	-26	-51	-21
					+24	-8	+30	-13	+33	+1	+39	-4	+45	+13	+51	+8
					+20	-4	+25	-8	+29	+5	+34	+1	+41	+17	+46	+13
80	120	0	-15		-28	-6	-35	0	-38	-16	-45	-10	-52	-30	-59	-24
					+28	-9	+35	-15	+38	+1	+45	-5	+52	+15	+59	+9
					+23	-4	+30	-10	+33	+6	+40	0	+47	+20	+54	+14
120	150	0	-18		-33	-8	-40	0	-45	-20	-52	-12	-61	-36	-68	-28
					+33	-10	+40	-18	+45	+2	+52	-6	+61	+18	+68	+10
					+27	-4	+33	-11	+39	+8	+45	+1	+55	+24	+61	+17
150	180	0	-25		-33	-8	-40	0	-45	-20	-52	-12	-61	-36	-68	-28
					+33	-17	+40	-25	+45	-5	+52	-13	+61	+11	+68	+3
					+26	-10	+32	-17	+38	+2	+44	-5	+54	+18	+60	+11
180	250	0	-30		-37	-8	-46	0	-51	-22	-60	-14	-70	-41	-79	-33
					+37	-22	+46	-30	+51	-8	+60	-16	70	+11	+79	+3
					+29	-14	+36	-20	+43	0	+50	6	+62	+19	+69	+13
250	315	0	-35		-41	-9	-52	0	-57	-25	-66	-14	-79	-47	-88	-36
					+41	-26	+52	-35	+57	-10	+66	-21	+79	+12	+88	+1
					+32	-17	+40	-23	+48	-1	+54	-9	70	+21	+76	+13
315	400	0	-40		-46	-10	-57	0	-62	-26	-73	-16	-87	-51	-98	-41
					+46	-30	+57	-40	+62	-14	+73	-24	+87	+11	+98	+1
					+35	-19	+44	-27	+51	-3	+60	-11	+76	+22	+85	+14
400	500	0	-45		-50	-10	-63	0	-67	-27	-80	-17	-95	-55	-108	-45
					+50	-35	+63	-45	+67	-18	+80	-28	+95	+10	+108	0
					+38	-23	+48	-30	+55	-6	+65	-13	+83	+22	+93	+15

## Deviations of form and position

Permissible deviations of form and position for shaft and housing where bearings are to be mounted are given in fig. 4.3 and table 4.5.



Tolerance name	Fit	Symbol of deviation	Permissible deviation depending on the tolerance class					
			P0	P6X	P6	P5	P4(SP)	P2(UP)
Tolerance of dimension	shaft housing	- -	-	IT6(IT5) IT7(IT6)	IT5 IT6	IT4 IT5	IT4 IT4	IT3 IT4
Tolerance of roundness and cylindricity	shaft	○ ○	t, t <sub>1</sub>	IT4 (IT3) IT4 (IT3)	IT3 (IT2) IT3 (IT2)	IT2 IT2	IT1 IT1	IT0 IT0
	housing	○ ○	t, t <sub>1</sub>	IT5 (IT4) IT5 (IT4)	IT4 (IT3) IT4 (IT3)	IT3 IT3	IT2 IT2	IT1 IT1
Tolerance of face runout	shaft housing	↗	t <sub>2</sub>	IT4 (IT3) IT5 (IT4)	IT3 (IT2) IT4 (IT3)	IT2 IT3	IT1 IT2	IT0 IT1
Tolerance of concentricity	shaft housing	○	t <sub>3</sub>	IT5 IT6	IT4 IT5	IT4 IT5	IT3 IT4	IT3 IT3
Tolerance of angularity	shaft	∠	t <sub>4</sub>	IT7 2	IT6 2	IT4 2	IT3 2	IT2 2

Table 4.5

In case of bearings on which adapter or withdrawal sleeves are to be mounted, the shaft tolerances for deviations of form and position should be to IT 5/2 tolerance class for shafts

with diameter tolerance h9 and IT7/2 for shaft tolerance h10.

Surface roughness of bearing seating is given in table 4.6.

Shaft and housing mounting surfaces roughness				Table 4.6
Bearing tolerance class	Shaft Diameter d, mm	Housing Diameter D, mm		
	≤80	80...500	≤80	80...500
Roughness $R_a$ , $\mu\text{m}$				
<b>P0, P6X and P6</b>	0,8 (N6)	1,6 (N7)	0,8 (N6)	1,6 (N7)
<b>P5, SP and P4</b>	0,4 (N5)	0,8 (N6)	0,8 (N6)	1,6 (N7)
<b>P2 and UP</b>	0,2 (N4)	0,4 (N5)	0,4 (N5)	0,8 (N6)

If bearings are mounted with adapter or withdrawal sleeves, shaft surface roughness should be of max.  $R_a = 1,6 \mu\text{m}$ .

The values of fundamental tolerances - ISO (tolerance classes IT0...IT12) are given in table 4.7.

Tolerance ISO (IT)															Table 4.7
Nominal dimension		over 1	3	6	10	18	30	50	80	120	180	250	315	400	500
over	up to	3	6	10	18	30	50	80	120	180	250	315	400	500	630
mm Tolerances in micrometers (0,001 mm)															
<b>IT0</b>	0,5	0,6	0,6	0,8	1	1	1,2	1,5	2	3	4	5	6		
<b>IT1</b>	0,8	1	1	1,2	1,5	1,5	2	2,5	3,5	4,5	6	7	8		
<b>IT2</b>	1,2	1,5	1,5	2	2,5	2,5	3	4	5	7	8	9	10		
<b>IT3</b>	2	2,5	2,5	3	4	4	5	6	8	10	12	13	15		
<b>IT4</b>	3	4	4	5	6	7	8	10	12	14	16	18	20		
<b>IT5</b>	4	5	6	8	9	11	13	15	18	20	23	25	27	29	
<b>IT6</b>	6	8	9	11	13	16	19	22	25	29	32	36	40	44	
<b>IT7</b>	10	12	15	18	21	25	30	35	40	46	52	57	63	70	
<b>IT8</b>	14	18	22	27	33	39	46	54	63	72	81	89	97	110	
<b>IT9</b>	25	30	36	43	52	62	74	87	100	115	130	140	155	175	
<b>IT10</b>	40	48	58	70	84	100	120	140	160	185	210	230	250	280	
<b>IT11</b>	60	75	90	110	130	160	190	220	250	290	320	360	400	440	
<b>IT12</b>	100	120	150	180	210	250	300	350	400	460	520	570	630	700	

## Bearing axial location

Axial location of bearings is necessary for a proper guiding of bearing in an assembly under operation.

An tight fit is inadequate for the axial location of bearing. In case of locating bearings, axial location for both rings is generally needed. Some important solutions of bearing axial location, on shaft or into the housing are shown in Fig. 4.4.

In case of bearings with light axial loads, bearings can be located using a lock nut and a lock washer (a), an end plate fastened by a screw at the shaft end (b) and, for bearings carrying light axial loads, by lock rings mounted in shaft and housing grooves (c).

Bearings with NR design, with groove and snap ring on the outer ring, can be easily located by the lock ring (d). Tapered roller bearings can be located by supporting the inner ring on the shaft shoulder and the outer ring with a threaded ring and a safety plate fastened by a screw (e).

Tapered bore bearings can be mounted and axially located by adapter or withdrawal sleeves (f, g).

The axial load carrying capacity of the bearings mounted with adapter or withdrawal sleeves is governed by the friction between shaft and sleeve (g).

To locate radial bearings, where axial adjustment of the shaft is required, setting washers (i) or spacer rings (j) are used between the outer rings, the width of the spacer ring being experimentally determined, during mounting.

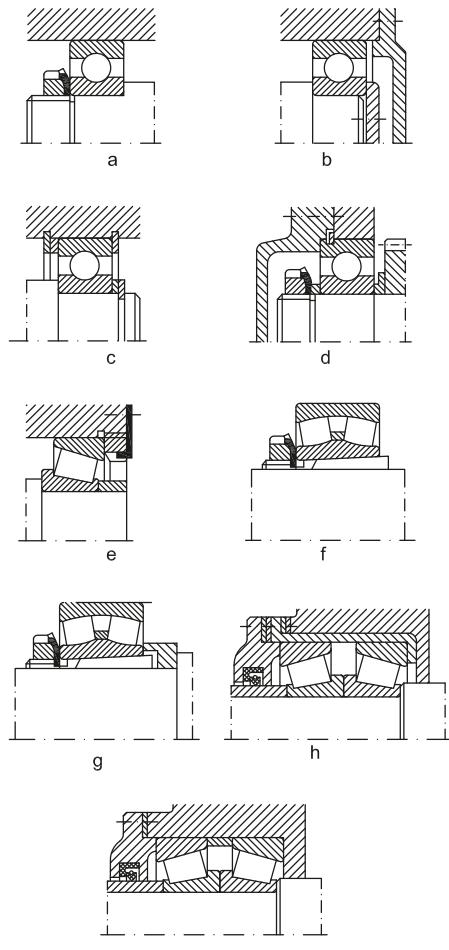


Fig. 4.4

## Bearing sealing

Seals are used in most of bearing arrangements and they must ensure the conditions of a proper operation.

For such a purpose, they have to prevent solid contaminants (dust, hard particles, water, aggressive substances etc.) from penetrating into the bearing and at the same time to retain the lubricant in the bearing.

Seals for rolling bearings can be classified considering some important criteria such as: design, operation, type of lubricant etc.

Considering their design and operation, seals can be: stationary seals between the stationary bearing elements (housing and cover), rotary seals, between the rotating bearing elements and they also can be rubbing seals or non-rubbing seals, which are used in special applications (surrounding conditions and loading stress).

Rotary non-rubbing seals are often used due to their simple design. They are particularly used at high speeds or temperatures, both for grease and oil, and have practically no friction and do not wear.

In case of bearing grease lubrication, bearing operating temperature must be lower with 20°C than the dropping point of the grease (melting temperature).

The main constructive types of rotary non-rubbing seals have narrow gaps, labyrinth and their combinations are shown in fig. 4.5 a-c.

Gap seals represent the simplest constructive solution for a rotary non-rubbing seal which have to retain grease in the bearing housing. The efficacy of sealing depends on the gap length (L)

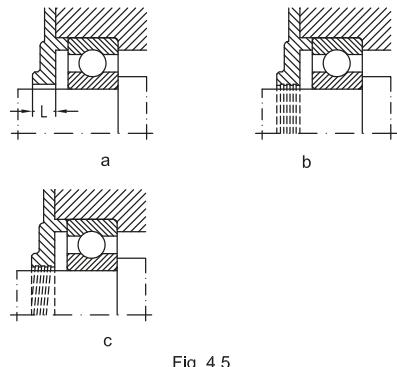


Fig. 4.5

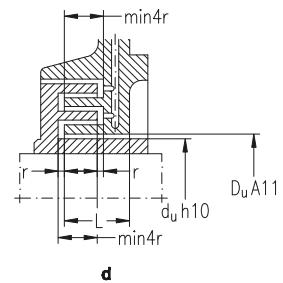
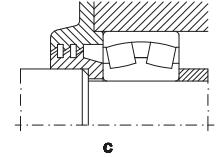
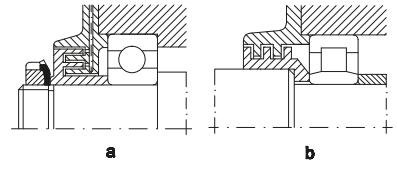


Fig. 4.6

and the clearance between shaft and housing. It can be improved by providing one or more circular grooves on the shaft or in the housing, which are to be filled with grease (b). In case of oil lubrication, the grooves on the shaft must be helical (c) and their direction must be the same with the direction of the shaft rotary movement.

Experiments proved that most favorable clearance is obtained between the limits of the fit A11/h10, geometrical deviations should be IT6 and gap surface roughness  $R_a = 12,6 \mu\text{m}$ .

Labyrinth seals are used at high peripheral speeds, in impure surroundings.

They are shown in fig. 4.6 a-d.

The labyrinth are spaces where periodically water-in-soluble grease (e.g. Lithium or Calcium base grease) is to be supplied.

The tongues of the labyrinth seals can be radically (a), axially (b) arranged or they can have inclined passages.

Details of an axial labyrinth design are given in fig. 4.6 d and values of axial clearance  $r$  and length  $L$  are given in table 4.8.

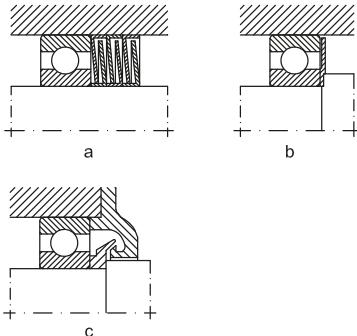


Fig. 4.7

In case of rotary rubbing seals there is a direct contact between a seal elastic element and the rotating element. They are shown in fig. 4.8.

When selecting the proper rotary rubbing seal, the following factors have to be considered: material and its elasticity (felt, rubber, plastics, leather, graphite, asbestos etc.); resistance at various temperatures, maximum peripheral speed on sealing surface; sealing direction etc.

These systems have sealing properties higher than those corresponding to non-rubbing seals. In case of grease lubrication at peripheral speeds higher than 4 m/s and temperatures over +100°C, felt ring seals (a) are frequently used because of their simple design and cheapness.

Before mounting, felt rings are impregnated during an hour with a mixture of mineral oil (66%) and paraffin (34%), at a temperature of +70...+80°C so that sealing properties are improved as the friction is reduced.

At higher temperatures and peripheral speeds over 12 m/s, surface roughness is  $R_a = 1,6 \mu\text{m}$  and the space between the ends of the seal should be filled with grease. Two felt rings can be used for sealing.

Rubbing seals with a spring incorporated are preferably to be used in case of oil lubricated bearings which are operated under peripheral speeds of 5-10 m/s, temperatures between -40°C and +20°C. Their efficacy depends on the material and operating surroundings.

In most cases, rubbing seals with a spring incorporated are made of synthetic rubber and have a metallic hardering fixture.

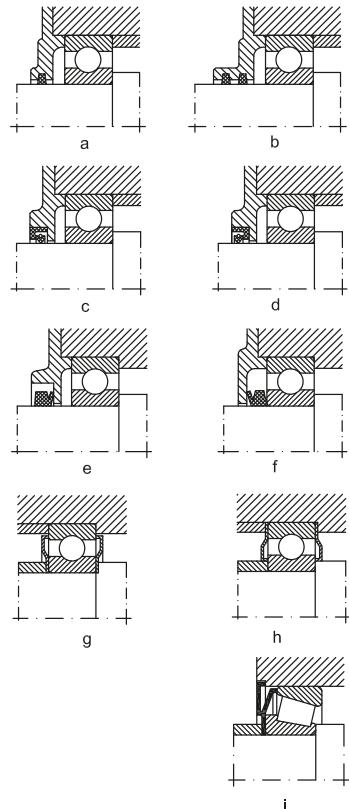


Fig. 4.8

Inclined sealing surfaces are recommended to be ground  $R_a=0,8 \mu\text{m}$  and hardened at 45 HRC, when operating at peripheral speeds over 8 m/s. Lubricant outflow can be stopped by monting the rubbing seal with incorporated spring with the edge inwards (c) or outwards (d) if sealing has to prevent dust or ohter impurities from penetrating into the bearing.

Double sealing with these rubbing seals can also be used.

V-ring seal is used to prevent dust or contaminants from penetrating into the bearing with best results both in case of grease or oil lubrication. The elastic rubber lip of the V-ring seal is notched on the plane sealing surface, drawing the fluids in centrifugal motion. V-ring seals are used at temperatures of  $-40^\circ\text{C}...+100^\circ\text{C}$ , roughness of sealing surface being  $R_a = 1,5 - 3 \mu\text{m}$ . Generally, at peripheral speeds up to 15 m/s,

the V-ring seal operates as a rubbing seal (seal lip reaches sealing surface), and at peripheral speeds over 15 m/s the seal lip will lift from the sealing surface, operating as a centrifugal sealing.

V-ring seals can also be used in case of angular misalignments of the shaft ( $2^\circ...3^\circ$ ), as they are made of high quality, elastic rubber, easy to be mounted.

The efficacy of sealing depends on the fact that the ring body acts as a flinger for dirt and fluids. Therefore, with grease lubrication the seal is generally arranged outside the housing and with oil lubrication it is placed inside the housing.

Pressed sheet washers provide simple, inexpensive and space - saving sealing especially for grease lubricated deep groove ball bearings. The washers are clamped against either the outer ring or the inner ring and exert a resilient pressure axially against the rubbing ring. In case of usual applications, the types of seals mentioned above or their combinations shown in fig. 4.9 are used, some of them becoming standard seals for rolling bearings (e.g. labyrinth, felt rings, V-rings etc.). Thus, better sealing can be obtained if felt ring (a) or V-ring (b) rubbing seals are combined with radial or axial labyrinth non-rubbing seals.

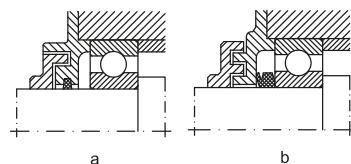


Fig. 4.9

Special seals are used in case of unusual surroundings and loading conditions (e.g. rolling mills, helm of ocean-vessels, main shaft of grinding machines etc.)

Sealed bearings of the type 2RS (2RSR) (a) or shielded bearings of the type 2Z (2ZR) (b) shown in fig. 4.10 a.b. provide simple and inexpensive sealing, with upper operating results. These rolling bearings are delivered ready greased, provision for relubrication and maintenance are not needed. They are used in case of bearings with small free space where other seals cannot be used.

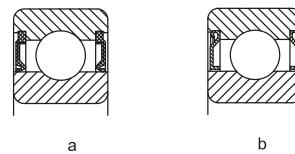


Fig. 4.10

# Bearing lubrication

Safe operating and long rating life of bearings depend on the lubricant type and quality and on the lubrication method. Bearing lubrication is used for certain purposes, such as:

- to reduce friction between rolling elements and raceway, rolling elements and cage, cage and guiding ribs of rings during operation;
- to ensure anticorrosive protection of bearings;
- to reduce noise in bearing within certain limits;
- to distribute heat uniformly in contact areas and to remove it outside through lubricant circulation.

Lubricants for bearings lubrication should satisfy the following conditions:

- they should have physical and chemical stability;
- foreign mechanical substances (abrasive, metallic substances etc.) are not admitted in lubricant;
- they should have a minimal coefficient of friction;
- to be non-corrosive;
- good unctuousness (lubricating capacity).

There are two categories of lubricants used for bearing lubrication:

- fluid lubricants (oils);
- plastic lubricants (greases).

Table 5.1 shows comparison between fluid and plastic lubricants.

Although fluid lubricants have better characteristics than plastic lubricants, they cannot be used in all cases because of sealing difficulties.

Comparative values for lubricants		
Characteristics	Lubricant Fluid	Plastic
speed	any value	low and medium
friction	low (reduced)	high
unctuousness	excellent	good
service life	long	short
cooling effect	high	low
replacement	easy	difficult

## Selection of lubricants

When selecting lubricants, much care is needed and all operating conditions and lubricant properties should be considered.

No lubrication system can be considered universal.

The most important criteria when selecting a lubricant have to be as follows:

- size of bearing
- speed
- load
- bearing operating temperature

These characteristic act upon lubricant viscosity as follows:

- the higher the bearing size, value of load and temperature, the higher the viscosity
- bearing speed acts by product  $D_{mn'}$  as show in table 5.2.

Corelation between  $D_{mn'}$  and lubricant type

Table 5.2

$D_{mn}$ over up to	Lubricant type	
-	$150 \times 10^3$	Mineral oil and grease with medium or high viscosity
$150 \times 10^3$	$300 \times 10^3$	Mineral oil with medium viscosity and grease
$300 \times 10^3$	$500 \times 10^3$	Mineral oil with low viscosity and grease
$500 \times 10^3$	$1200 \times 10^3$	Mineral oil with low viscosity and lubricating equipment

## Grease lubrication

Grease can be used to lubricate rolling bearings only when product  $D_m \leq 500 \times 10^3$  and it offers the following advantages:

URB

- it is more easily retained in the bearing;
- it assures anti-corrosive protection to bearing as it is water-resistant;
- low expenses for sealing.

The grease quantity to be supplied shouldn't be excessive, otherwise rotation is braked, friction increases and also operating temperature without extending the bearing rating life.

The quantity of grease that is to be inserted in bearing seating should be as follows, considering the free space inside the housing:

- 1/2... 3/4 of the free space in the housing, in case of normal speeds;
- 1/3 of the free space in the housing, in case of high speeds and speed limit;
- the whole housing space should be free, in case of low speeds and product  $Dm n < 10 \times 10^3$ .

The quantity of grease can be calculated as a function of bearing bore diameter using the equation:

$$G = K d^{2.5}, g.$$

where:

$K = 1/900$  - for ball bearings

$K = 1/350$  - for roller bearings

$d$  = bore diameter, mm

Relubrication intervals in most cases can be experimentally determined and depend on:

- bearing type
- bearing size
- operating temperature
- grease properties

Grease service life and relubricating interval can be calculated from:

$$T_{ur} = k_0 \left( \frac{14 \times 10^6}{n\sqrt{d}} - 4d \right) f_1 f_2$$

where:

$T_{ur}$  = service life or relubricating interval, in operating hours

$k_0$  = coefficient depending on the bearing type, table 5.3

$n$  = speed, r/min

$d$  = bore diameter, mm

$f_1$  = temperature factor, table 5.4

$f_2$  = factor depending on the operating conditions, table 5.5

Values for coefficient $k_0$		
Table 5.3		
Bearing type	Value of $k_0$	Grease Relubrication interval service life
Angular contact ball bearings		
Tapered roller bearings		
Thrust ball bearings	1	2
Cylindrical roller bearings	5	15
Needle roller bearings		
Deep groove ball bearings	10	20...40

Values for factor $f_1$			
Table 5.4			
Temperature	70°C	85°C	100°C
Factor $f_1$	1	0,5	0,25

Values for factor $f_2$				
Table 5.5				
Operating conditions	Light	Moderate	Hard	Very hard
Factor $f_2$	1	0,7...0,9	0,4...0,7	0,1...0,4

Low values are valid for deep groove ball bearings with shields, 2Z type, or with seals, 2RS type, series 60, 62 and 63.

Bearing relubrication interval can be also determined using the chart - fig. 5.1, as a function of bearing type, bore diameter and speed.

#### Example:

A bearing 6208-2RSR is operated under reduced load (it is not considered for calculation), at a speed  $n = 1500$  r/min, at a temperature of +60 deg C, light operating conditions. What is the grease service life and relubrication interval?

Grease service life will be:

$$T_u = k_0 \left( \frac{14 \times 10^6}{n\sqrt{d}} - 4d \right) f_1 f_2 = 32893 \text{ hours.}$$

$k_0 = 25$  from table 5.3

d = 40 mm

$f_1 = 1$ , from table 5.4

$f_2 = 1$ , from table 5.5

Relubrication interval:

$$T_r = k_0 \left( \frac{14 \times 10^6}{n\sqrt{d}} - 4d \right) f_1 f_2 = 13157 \text{ hours.}$$

$k_0 = 10$ , from table 5.3

$f_1, f_2 = 1$ , from tables 5.4, 5.5.

Values for coefficient K	
Relubrication interval	K
weekly	0,0015...0,0020
monthly	0,0020...0,0030
yearly	0,0030...0,0045
after 2...3 years	0,0045...0,0055

Table 5.6

## **Relubrication interval**

K

0,0015...0,0020

0,0020...0,0030

0.0030 0.0045

0.0045–0.0055

From the diagram fig. 5.1, the value of the relubrication interval will be of 13500 operating hours.

The grease quantity to be supplied can be determined using the equation:

$$G = KDB, g,$$

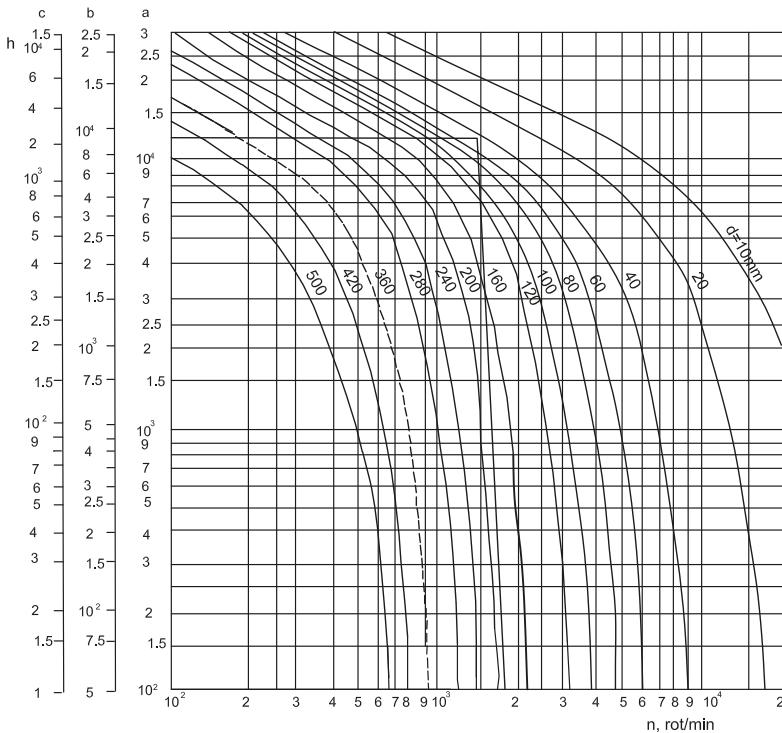


Fig.5.1

#### Scale a; deep groove ball bearings

Scale b; cylindrical roller bearings

Scale c; spherical roller bearings, thrust ball bearings, cylindrical roller bearings without cage.

where:

G = grease quantity, g

K = coefficient depending on the relubrication interval, table 5.6

D = bearing outside diameter, mm

B = total bearing width for radial bearings, mm and total bearing height for thrust bearings, mm

The chart in fig. 5.1 applies to operating temperatures which do not exceed +70°C. For operating temperatures over +70°C, see table 5.4.

Grease service life can be defined as the period of time when it preserves physical and mechanical characteristics in time and oxidizing due to temperature and vaporization of base oil doesn't occur.

A more accurate calculation of grease service life, considering grease quality and bearing operating conditions (load, size, speed, temperature etc.) can be done using the equation:

$$L = 10^{a-(m_1 + m_2 + m_3)}$$

where

L = service life, operating hours

a = exponent depending on the grease quality (a = 5,8... 6,1)

$m_1 \dots m_3$  = exponents which take into account the following factors:

$$m_1 = 4,4 \times 10^{-6} D_m n,$$

$$m_2 = 2,5 (P/C - 0,05),$$

$$m_3 = (0,021 - 1,80 \times 10^{-6} D_m n) t,$$

$D_m$  = bearing mean diameter, mm

n = bearing speeds, r/min,

P = equivalent radial load, kN,

C = basic dynamic load, kN,

t = bearing operating temperature, °C

When calculating the values of t,  $D_m$  n and P/C, the following have to be considered:

- when bearing operating temperature is lower than +50°C, then t = +50°C

- when speed factor  $D_m$  n < 125000, then  $D_m$  n = 125000

- when ratio P/C < 0,05, then P/C = 0,05

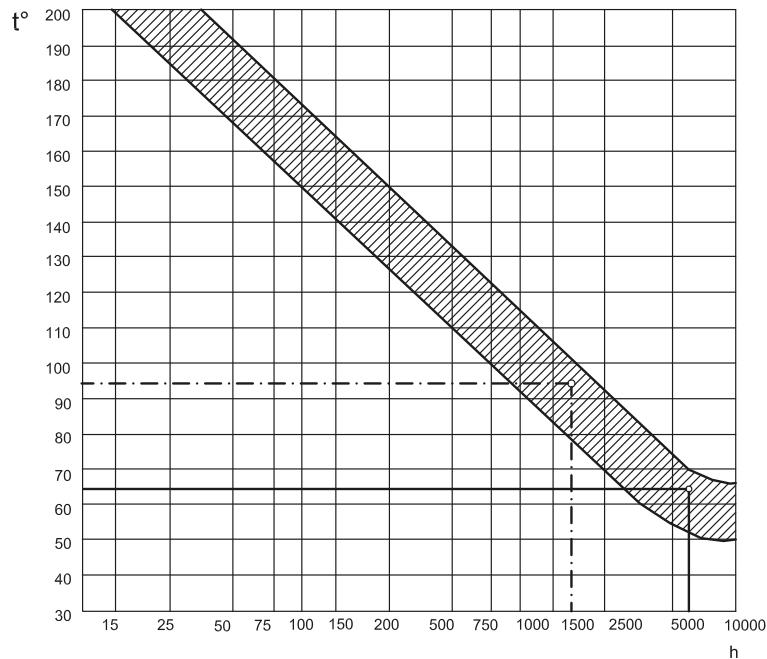


Fig.5.2.

Grease service life, as a function of operating temperature can be approximately determined using the diagram fig. 5.2.

#### Example 1

A bearing 6210 operates under a load  $P_r = 5 \text{ kN}$ , speed  $n = 3000 \text{ r/min}$  at an operating temperature  $t = 50^\circ\text{C}$ . What is the service life of the grease used for bearing lubrication?

$$C_r = 35,1 \text{ kN}, \text{ tables on page 101. bearing 6210}$$

$$L = 10^{a-(m_1+m_2+m_3)} = 10^{6,1-2,273} = 6214 \text{ hours}$$

$a = 6,1$ , for Mobil grease,

$$D_m n = 65 \times 3000 = 195 \times 10^3$$

$$P_r/C_r = 5/35,1 = 0,143$$

$$m_1 = 4,4 \times 10^{-6} D_m n = 0,858$$

$$m_2 = 2,5 (P_r/C_r - 0,05) = 0,23$$

$$m_3 = (0,021 - 1,80 \times 10^{-8} D_m n) 65 = 1,119$$

#### Example 2

For the same bearing and operating conditions as in Example 1, it is required to find the service life of the same grease at a temperature of  $t = 95^\circ\text{C}$ .

$$m_3 = 1,66$$

$$m_1 + m_2 + m_3 = 2,794$$

$$L = 10^{6,1-2,794} = 10^{3,306} = 1774 \text{ operating hours}$$

From the diagram fig. 5.2, we can find approximately the same value, respectively 6000 operating hours at  $+ 65^\circ\text{C}$  and 170<sup>o</sup> operating hours at  $+95^\circ\text{C}$ .

Table 5.7 shows technical characteristics of usual grease, which are recommended for lubrication of sealed and shielded bearings, 2RS and 2Z types and also for rolling bearings in various assembled and machines.

**Technical characteristics for usual greases for bearing lubrication**

Table 5.7

Grease main components	Dropping point °C	Temperature range (continuous running)	Application	Grease type, producer	
Base oil      Thickener					
Mineral oil      Lithium soap	170°C-190°C	-30°C...+130°C	Ball, roller and needle roller bearings: - small and medium sized; - moderate speed, - temperatures up to 70°C	- Mobilux 2-3, Mobil Austria, - Castrol Spherol SRB2, Castrol Germany - Shell Alvania R 2-3, Shell England - Aguila Nr30, Brugarolas Spain	
Mineral oil + additive for excessive pressure (EP)	Lithium soap	185°C-190°C	-30°C...+150°C	Ball and roller bearings, - moderate speeds, - heavy loads, shock loads, - continuous running temperature +130°C, - initial lubrication and relubrication at periods of 6-9 months	- Mobilux EP 2-3, Mobil Austria - Shell Alvania EP 2-3, Shell England - Beacon EP 2, Esso Germany
Synthetic oil (diesteric)	Lithium soap	180°C-230°C	-50°C...+120°C	Bearings for electrical motors, generators, electronic equipment, - small sizes, - light loads, - high speeds $D_m \times n \leq 1000 \times 10^3$	- Beacon 325, Esso Germany
Synthetic oil (diesteric)	Lithium soap	190°C-230°C	-50°C...-120°C	Bearings for electrical motors, generators, electronic equipment, - small sizes, - light loads, - high speeds $D_m \times n \leq 1000 \times 10^3$	- Izoflex LDS 18 Special A, Kluber Lubrication Germany
Mineral oil	Complex calcium soap	100°C-180°C	-30°C..+130°C	Bearings for general applications, - heavy loads, moderate speeds - continuous running temperature 100°C	- Beacon 2-3, Esso Germany - Beacon EP1, Esso Germany
Synthetic oil	Whithout soap, syntetic thickener	indeterminate	-30°C...-250°C	Bearings for general applications, - large sizes, - low speeds $D_m \times n < 200 \times 10^3$ , - high temperature	- Barleta 1S, Kluber Lubrication Germany
Syntetic oil + additive for excessive pressure (EP)	Whithout soap, syntetic thickener	265°C	-54°C...+177°C	Spherical roller thrust bearings, roller thrust bearings etc., bearings operating with high friction, - moderate and high speeds, - low and high temperatures	- Mobilgrease 28, Mobil Austria
Synthetic oil	Whithout soap, inorganic thickener	260°C	-50°C...+177°C	Bearings for general applications, - light loads, - high speeds, - low and high temperatures	- Armingras BT-2, Brugarolas Spain
			-30°C...+140°C	Cylindrical roller bearings, - moderate and high speeds $D_m \times n \leq 300 \times 10^3$	- Staburags NBU12, Kluber Lubrication Germany
			0°C...+260°C	Roller bearings operating at high temperatures	- Mobilitemp 1-2, Mobil Austria

## Oil lubrication

Oil lubrication can be used in any operating condition, but this kind of lubrication is compulsory when the value of the product  $D_m n$  from table 5.2 is exceeded for grease, namely  $D_m n > 500 \times 10^3$  and when high temperatures occur in bearing. Then, oil has to lubricate and to remove heat from bearing.

Oils used for bearing lubrication can be:

- mineral oils, used up to a temperature of  $+150^\circ\text{C}$ .

- synthetic oils, used up to a temperature of  $+220^\circ\text{C}$ .

For a proper lubrication of bearings, low quantities of lubricants to reach the rolling elements are needed.

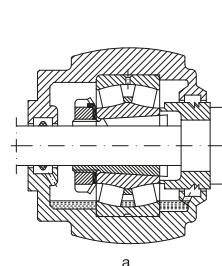
The lubricating systems must provide oil quantity necessary to prevent oil draining from bearing and heat removal in case of high speeds.

Most usual oil lubricating systems depending on factor  $D_m n$  are given in tables 5.8.

### Oil lubricating systems

Table 5.8

Lubricating system	Operating conditions	Factor $D_m n$	Oil viscosity at $40^\circ\text{C}$	Example in fig.
$\text{m}^2/\text{s}$				
Oil bath	Bath is filled up to the lowest rolling element for horizontal shaft and 70-80% of bath width for vertical shaft	$< 250 \times 10^3$	$(17....300) \times 10^{-6}$	5.3 a), b)
Oil bath with external circulation	Central tank, oil circulates under a pressure of 1,5 MPa. High speeds.	$< 600 \times 10^3$	$(45...175) \times 10^{-6}$	5.4
Oil injection	Oil is injected into the operating area under a pressure of 0,1...0,5 MPa, with flow capacity of 0,5...10 l/min depending on temperature. Heavy loads and high speeds.	$< 900 \times 10^3$	$(13,5...80) \times 10^{-6}$	5.5
Oil spot	Oil in air current under a pressure of (0,05...0,5) MPa, flow capacity of (0,5...4) $\text{m}^3/\text{hour}$ for small and medium sized bearings, heavy loads and high speeds.	$< 1200 \times 10^3$	$(10...45) \times 10^{-6}$	5.6



a

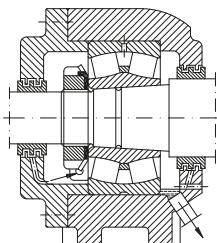
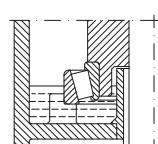


Fig. 5.4



b

Fig. 5.3

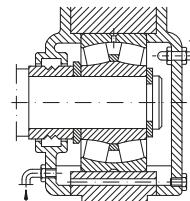
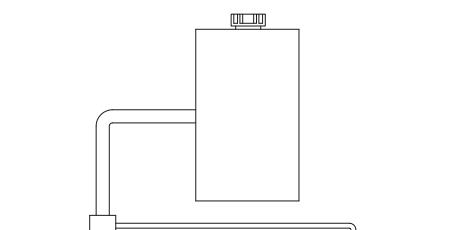


Fig. 5.5

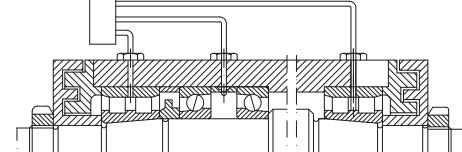


Fig. 5.6

Approximate values of oil kinematic viscosity at +40°C depending on the operating temperature are given in table 5.9.

Corelation between viscosity and temperature		
Temperature t°C	Viscosity at 40°C, cSt	
over	up to	
-	50	12..60
50	80	37..75,5
80	120	> 75,5
120	150	227

Diagram fig. 5.7 shows kinematic viscosity classes at 40°C in accordance with ISO, its variation depending on the operating temperature (t°C) in relation to speed and bearing mean diameter ( $D_m$ ).

#### Example

A bearing 6204 is to operate under a speed  $n = 2000$  r/min at a temperature  $t = +65^\circ\text{C}$ .  $D_m = 0,5$  ( $d+D$ ) = 35,5 mm.

The viscosity of the oil for bearing lubrication is required.

From the diagram, for  $D_m = 35,5$  mm, we can find viscosity at  $+65^\circ\text{C}$ ,  $v_1 = 13$  cSt and viscosity at  $+40^\circ\text{C}$ ,  $v = 32$  cSt.

Table 5.10 shows oils which are recommended by ISO for bearing lubrication. Values of kinematic viscosity at  $+40^\circ\text{C}$ ,  $\text{mm}^2/\text{s}$  are also given.

Recommended oils by ISO standards			
Class ISO	Kinematic viscosity at $+40^\circ\text{C}$ , $\text{mm}^2/\text{s}$		
	mean	low	high
ISO VG 2	2,2	1,98	2,42
ISO VG 3	3,2	2,88	3,52
ISO VG 5	4,6	4,14	5,06
ISO VG 7	6,8	6,12	7,48
ISO VG 10	10	9	11
ISO VG 15	15	13,5	16,5
ISO VG 22	22	19,8	24,2
ISO VG 32	32	28,8	35,2
ISO VG 46	46	41,4	50,6
ISO VG 68	68	61,2	74,8
ISO VG 100	100	90	110
ISO VG 150	150	135	165
ISO VG 220	220	198	242
ISO VG 320	320	288	352
ISO VG 460	460	414	506
ISO VG 680	680	612	748
ISO VG 1000	1000	900	1100
ISO VG 1500	1500	1350	1650

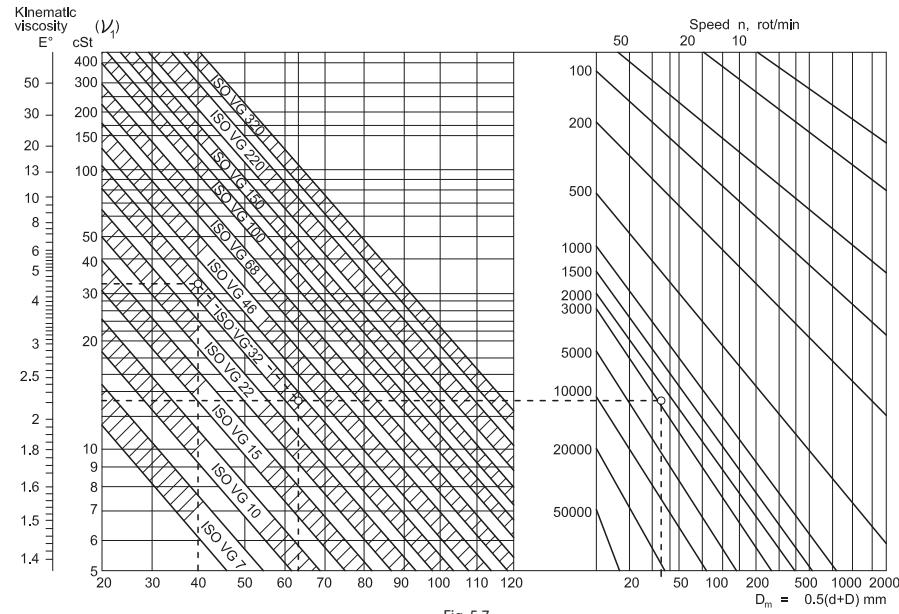


Fig. 5.7

# Bearing designation

The purpose of designation is that of identification of bearings, so that bearings with the same designation to be interchangeable both dimensionally and operationally, no matter who the producers may be. Designation of URB rolling bearings are in accordance with those used by

world-know bearing companies: SKF, GAF, INA, KOYO etc.

The completedesignation of a bearing consists of a basic design and may include one or more supplementary designations (prefixes and suffixes), as shown in chart fig. 6.1.

Prefixes		Basic designation					Suffixes			
Materials	Special designs, component parts	Bearing type	Dimension series	Bore diameter identification	Group I	Group II	Group III	Group IV		
					Internal design, contact angle	Constructive characteristics, taper, seals	Cages, materials, guiding surfaces	Tolerance class, clearance		
Bearing series designation										

Fig. 6.1.

The basic designation consists of an identification of the type of bearing (figure or letter), the series designation, in accordance with ISO and the bore diameter identification.

The designation of the bearing type and dimension series, for main standardized bearing types, are given in table 6.1.

Bore diameter identification consist of one, two or more figures as follows:

- bore diameter from 1 to 9 mm - one figure, representing the bore diameter (e.g. 623, 608);
- bore diameter from 10 to 495 mm - two figures, as follows: 00 for 10 mm, 01 for 12 mm, 02 for 15 mm, 03 for 17 mm, 04 and up to 99 for bore diameter from 20 to 495 mm. (bore diameter = bore diameter identification x 5, e.g. 6230, d = 150 mm);

- bore diameter of 500 mm and over 500 mm - is stated directly separated by a slash, the same applies to the values which are not perfect multiples of 5, or if they include a decimal point (e.g. 610/560, 62/32, 62/1,5).

Tapered roller bearings with inch dimensions listed in this catalogues make an exception from this rule.

## Prefixes

Prefixes are letter-identifications which indicate the material, other than steel for bearings or component parts of bearing. The prefix for material is separated by a horizontal line from the rest of designation.

URB

## Designation of the type and dimension series for the standardized bearings

Table 6.1

Bearing design	Bearing type identification	Series designation	Example
	6	18 10 03 19 02 23 00 22 04	61952 6208
	1	10 03 02 23 22	1205 11210
	7	10 02 03	7030C 7210B
	0	32 33	3207 3316D
	NU	10 02 22 03	NU208
	NJ	23 04	NJ2206
	N		N310
	NUP		NUP209
	NNU	49	NNU4920
	NN	30	NN3015
	NA	48 49	NA4905 NA121815 NA 85/26
	NA	69	NA6912
	2	30 41 13 40 22 23 31 32	22216 25130
	3	29 22 23 20 03 02 13	32010 32208 34115
	35	0	35130
	5	11 13 12 14	51115 51212
	5	22 23 24	52205 52308

## Prefixes for materials

- H** - heat-resisting steel (e.g. H - NUP 210)
- M** - copper alloy (e.g. M - 6008)
- S** - plastics, glass, ceramics etc. (e.g. S - 6204)
- SS** - stainless steel (e.g. SS - 6202)
- T** - case-hardening steel (e.g. T - 35352)

## Prefixes for special designs or parts of bearings

- K** - cage with rolling elements of dismountable bearing (e.g. KNU205)
- L** - free ring of dismountable bearing (e.g. LNU205) (interchangeable ring, e.g. L30205)
- R** - dismountable bearing without free ring (e.g. RNU205; RN205)
- E** - shaft washer of thrust ball bearing (e.g. E51210)
- W** - housing washer of thrust ball bearing (e.g. W51216)

## Suffixes

Suffixes are used to identify various constructive modifications of the bearing in comparison to normal design. They are classified in four different groups, as follows:

- Group I** - Modifications of internal design, design with increased basic load (e.g. A, C, E etc.), contact angle (e.g. A, B, C) and others.
- Group II** - Modifications of external design, tapered bore, groove on outer ring etc. (e.g. 30205A, 1210K, 6210NR, 6310-2RS)
- Group III** - Modifications of cage design, material, guiding surfaces etc. (e.g. 6205TN, NU310MA)
- Group IV** - Modifications of normal design regarding tolerance classes, bearing radial or axial clearance, stability of dimensions at high temperatures, bearing matching etc. (e.g. 6206P5, 6310P53, NU210SO, 7010CDB).

These suffixes for bearing designation are listed considering the groups they belong to, at the beginning of each bearing group.

# Mounting and dismounting

Proper operation of rolling bearings is also determined by a proper selection of the solution of mounting and dismounting, considering the type and size of bearing, fit, adequate tools for these operations, performance etc.

As being precision components, rolling bearings should be handled carefully when storing or mounting. Thus, the following conditions should be observed:

- storing in their original package, on special shelves, in dry room, temperature of  $+18^{\circ}\text{C}...+20^{\circ}\text{C}$ , maximum moisture degree of 60%
- handling bearings, while storing and mounting, should be carefully done so that original package to be protected and not to be deteriorated.
- bearings should be unpacked only when they are to be mounted.

They shouldn't be washed if original package hasn't been destroyed.

- as the adjoint parts of bearing are accurate, without burrs, chips or hits, special care should be taken.

## Mounting of bearings with cylindrical bore

Bearings with cylindrical bore which are to have tight fit on shaft or in housing respectively, will be mounted by mechanical, thermic or hydraulic means.

The pressing force should be transmitted only by the ring which is pressed on the shaft or into the housing bore. Transmission by rolling bearings should be avoided as they can get defromed and premature damage can occur.

Special sleeves with one or two ribs, fig. 7.1, a and b are used when mounting small and medium-sized bearings, which are to be mounted with transition fit. In case of self-aligning ball

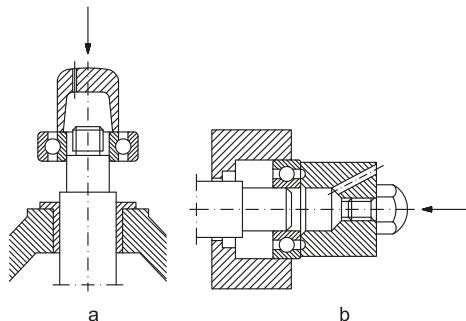


Fig. 7.1

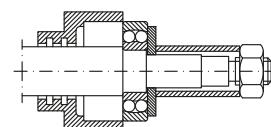


Fig. 7.2

bearings or spherical roller thrust bearings, a plate is mounted for a proper location of the outer rings, as shown in fig. 7.2.

Mechanical or hydraulic presses are used as shown in fig. 7.3, in case of serial production so that force can be continuously and gradually applied.

For the mounting of bearings with clearance fit into the housing or on the shaft, the ring with transition or tight fit should be mounted first, after which the shaft-bearing assembly will be mounted into the housing as shown in fig. 7.4, a and b.

In case of dismountable bearings, rings can be mounted separately - fig. 7.5, even if an tight fit is required for both rings.

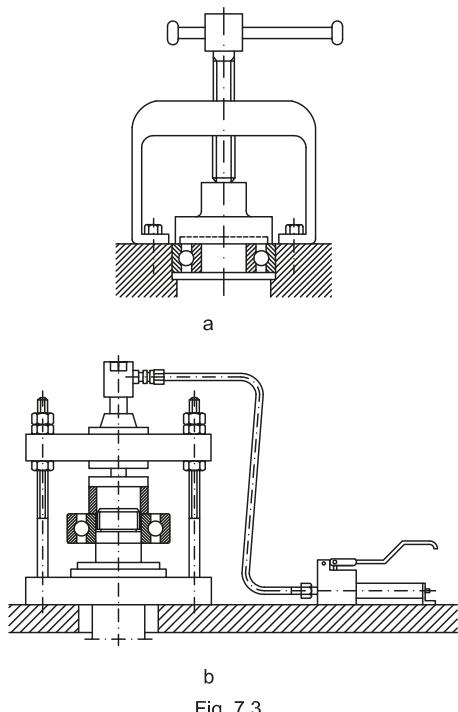


Fig. 7.3

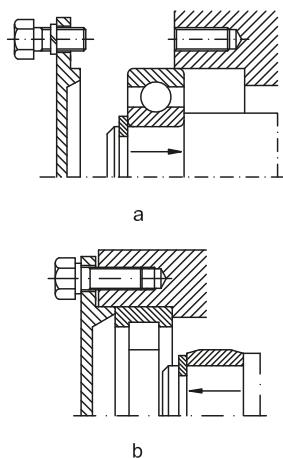


Fig. 7.4

The mounting of medium ( $d > 50$  mm) and large-sized bearings with tight fit, requires much greater pressing forces. That's why in this case heating of bearings up to  $+80^{\circ}\text{C}...+110^{\circ}\text{C}$  should be used instead of pressing, excepting shielded bearings, 2Z (2ZR) type and sealed bearings, 2RS (2RSR) type.

For the bearings heating, oil bath, electric range, heating device with thermic ring or induction heating device etc. can be used as shown in fig. 7.6, a-d.

The device with thermic ring - fig. 7.6 c consists of a split aluminium ring with three grips and cuts which make it be elastic.

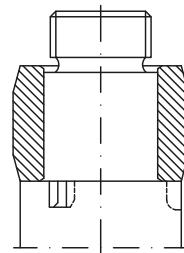


Fig. 7.5

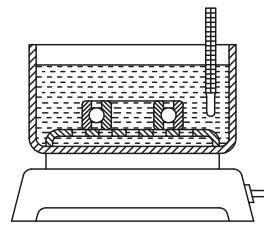
Thermic ring bore diameter is equal to inner ring raceway diameter of dismountable bearings.

The ring outside diameter can be calculated using the equation:

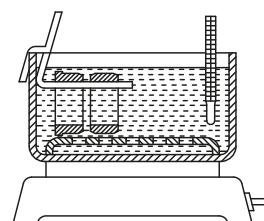
$$D_{\text{ex}} = \sqrt{4d_1^2 - 3d^2}, \text{ mm}$$

where:

$D_{\text{ex}}$  = outside diameter of the thermic ring,  
 $d_1$  = diameter of the inner ring raceway, mm  
 $d$  = bearing bore diameter, mm



a



b

Fig. 7.6

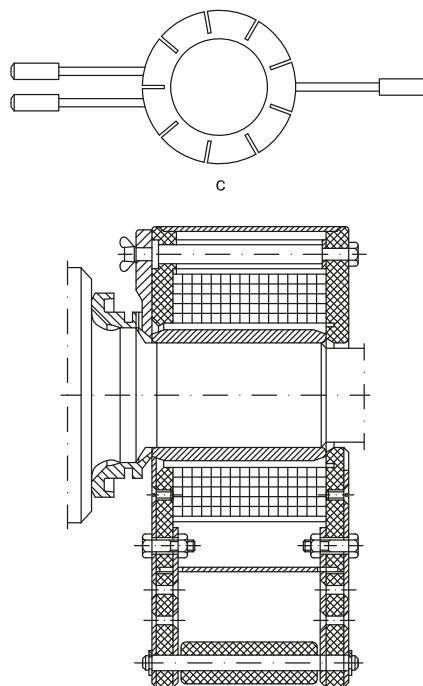


Fig. 7.6 (continued)

The mass of the thermic ring is approximately equal to the mass of the bearing inner ring.

In case of large-sized cylindrical roller bearings, heating is done with induction devices. These devices consist of a coil inductor, thermal relays for temperature adjustment and timers. 380 V voltage and 50 - 60 Hz frequency inductors are used for bearings with bore diameter up to 200 mm. For larger-sized bearings, 20... 40 V voltage and 50 - 60 Hz inductors are used.

This device is schematically shown in fig. 7.6.d.

### Mounting of bearings with tapered bore

Tapered bore bearings can be mounted directly on the shaft, on adapter sleeve or withdrawal sleeve. These bearings should always be mounted only with a tight fit. The tight fit can be done by an axial displacement of the bearing inner ring which is mounted directly on the tapered spindle of the shaft or by an axial displacement of the adapter or withdrawal sleeve.

The values of reduction in radial clearance are given in tables 7.1 and 7.2, as function of

axial displacement on shaft of self-aligning ball bearings and spherical roller thrust bearings. After mounting the initial radial clearance is to be considered.

After mounting, radial clearance of radial and self-aligning ball bearings are in accordance with table 7.1.

The values of tightening are estimated by the values of the radial clearance reduction or of axial displacement. Axial displacement of the mounted bearings is measured by means of a limit gauge, as shown in fig. 7.7, a and b. The thickness of the limit gauge can be calculated from:

$$m = S - a$$

where:

$m$  = thickness of the limit gauge, mm

$S$  = distance initially measured, mm

$a$  = axial displacement, from table 7.1, mm

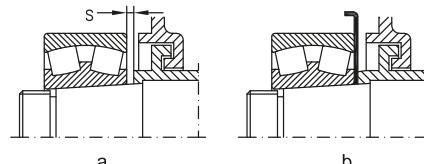


Fig. 7.7

### Example

A bearing 22252,  $d = 260$  mm, taper: 1:12, distance  $s = 10$  mm, distance "a" from table 7.1 = 1,90 mm,  $m = 10 - 1,9 = 8,10$  mm

Small-sized bearings with tapered bore which are to be mounted directly on the shaft or with adapter or withdrawal sleeves can be axially displaced by means of a nut as shown in fig. 7.8, a, or by means of a special sleeve as in fig. 7.8 b,c.

Medium-sized bearings can be axially displaced by means of a special nut as shown in fig. 7.9 and some screws. Then, the nut is to be dismounted and replaced with a nut for axial fastening.

Special hydraulic presses - fig. 7.11 are used to mount medium and large-sized bearings.

To reduce the bearing displacing force in case of large-sized bearings, pressurized oil is to be introduced between the tapered surfaces of the shaft spindle, bearing and b, by means of an oil pump - fig. 7.10 or oil injector - fig. 7.12.

One or more grooves, should be provided as shown in fig. 7.13, a and b so that oil can be distributed between the mounting surfaces.

Values for self-aligning ball bearings radial clearance, after mounting										
Values in mm		Bore diameter d		Reduction of radial clearance		Axial displacement "a", taper 1:12 on tapered sleeve			Minimum radial clearance after mounting, in case of clearance group	
over	up to	low	high	low	high	low	high	normal	C3	
-	<b>20</b>	0,003	0,010	0,22	0,23	0,24	0,25	0,01	0,02	
<b>20</b>	<b>30</b>	0,005	0,010	0,22	0,23	0,23	0,24	0,01	0,02	
<b>30</b>	<b>40</b>	0,009	0,015	0,30	0,30	0,32	0,32	0,01	0,02	
<b>40</b>	<b>50</b>	0,010	0,016	0,31	0,34	0,35	0,37	0,015	0,025	
<b>50</b>	<b>65</b>	0,012	0,018	0,9	0,41	0,40	0,42	0,015	0,03	
<b>65</b>	<b>80</b>	0,015	0,025	0,43	0,47	0,45	0,50	0,02	0,04	
<b>80</b>	<b>100</b>	0,022	0,030	0,54	0,60	0,56	0,62	0,02	0,04	
<b>100</b>	<b>120</b>	0,025	0,035	0,58	0,70	0,60	0,75	0,025	0,055	

Values for spherical roller bearings radial clearance, after mounting												
Values in mm		Bore diameter d		Reduction of radial clearance		Axial displacement "a", taper 1:12 on tapered shaft		Axial displacement "a", taper 1:30 on tapered sleeve		Minimum radial clearance after mounting, in case of clearance group		
over	up to	low	high	low	high	low	high	low	high	normal	C3	C4
<b>30</b>	<b>40</b>	0,02	0,025	0,35	0,4	0,35	0,45	-	-	0,015	0,025	0,04
<b>40</b>	<b>50</b>	0,025	0,03	0,4	0,45	0,45	0,5	-	-	0,02	0,03	0,05
<b>50</b>	<b>65</b>	0,03	0,04	0,45	0,6	0,5	0,7	-	-	0,025	0,035	0,055
<b>65</b>	<b>80</b>	0,04	0,05	0,6	0,75	0,7	0,85	-	-	0,025	0,04	0,07
<b>80</b>	<b>100</b>	0,045	0,06	0,7	0,9	0,75	1	1,7	2,2	1,8	2,4	0,035
<b>100</b>	<b>120</b>	0,05	0,07	0,7	1,1	0,8	1,2	1,9	2,7	2	2,8	0,05
<b>120</b>	<b>140</b>	0,065	0,09	1,1	1,4	1,2	1,5	2,7	3,5	2,8	3,6	0,055
<b>140</b>	<b>160</b>	0,075	0,1	1,2	1,6	1,3	1,7	3	4	3,1	4,2	0,055
<b>160</b>	<b>180</b>	0,08	0,11	1,3	1,7	1,4	1,9	3,2	4,2	3,3	4,6	0,06
<b>180</b>	<b>200</b>	0,09	0,13	1,4	2	1,5	2,2	3,5	4,5	3,6	5	0,07
<b>200</b>	<b>225</b>	0,1	0,14	1,6	2,2	1,7	2,4	4	5,5	4,2	5,7	0,08
<b>225</b>	<b>250</b>	0,11	0,15	1,7	2,4	1,8	2,6	4,2	6	4,6	6,2	0,09
<b>250</b>	<b>280</b>	0,12	0,17	1,9	2,6	2	2,9	4,7	6,7	4,8	6,9	0,1
<b>280</b>	<b>315</b>	0,13	0,19	2	3	2,2	3,2	5	7,5	5,2	7,7	0,11
<b>315</b>	<b>355</b>	0,15	0,21	2,4	3,4	2,6	3,6	6	8,2	6,2	8,4	0,12
<b>355</b>	<b>400</b>	0,17	0,23	2,6	3,6	2,9	3,9	6,5	9	6,8	9,2	0,13
<b>400</b>	<b>450</b>	0,2	0,26	3,1	4,1	3,4	4,4	7,7	10	8	10,2	0,13
<b>450</b>	<b>500</b>	0,21	0,28	3,3	4,4	3,6	4,8	8,2	11	8,4	11,2	0,16
<b>500</b>	<b>560</b>	0,24	0,32	3,7	5	4,1	5,4	9,2	12,5	9,6	12,8	0,17
<b>560</b>	<b>630</b>	0,26	0,35	4	5,4	4,4	5,9	10	13,5	10,4	14	0,2
<b>630</b>	<b>710</b>	0,3	0,4	4,6	6,2	5,1	6,8	11,5	15,5	12	16	0,21

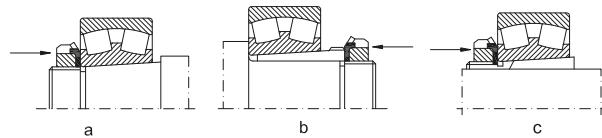


Fig. 7.8

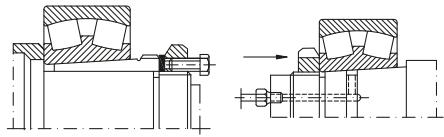


Fig. 7.9

Fig. 7.10

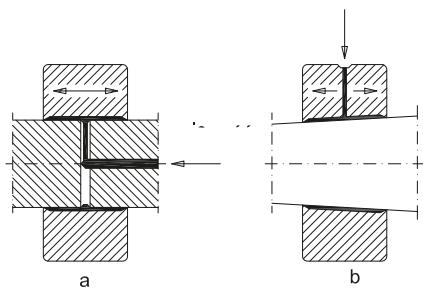


Fig. 7.11

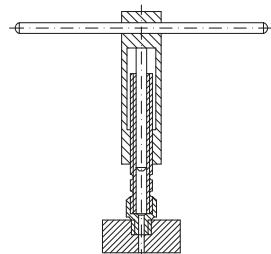


Fig. 7.12

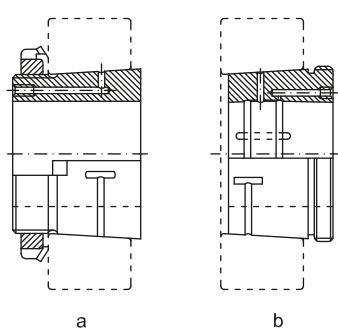


Fig. 7.13

## Bearing dismounting

When bearings with tapered bore are to be dismounted from the shaft or housing, the succession of operations is inversely done than in case of mounting.

Thus, the assembly mounted with clearance fit or small tightening is to be dismounted first and then the parts mounted with greater tightening, as shown in fig. 7.14 and fig. 7.15.

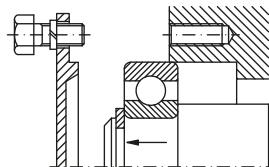


Fig. 7.14

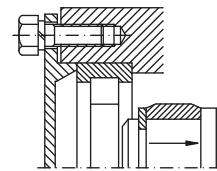


Fig. 7.15

To use mechanical or hydraulic instruments, when dismounting bearings, a special design of the shaft and housing is required, as shown in fig. 7.16, a-c: withdrawal grooves (a) and (b), threaded bores (c), grooves for oil distribution, fig. 7.13.

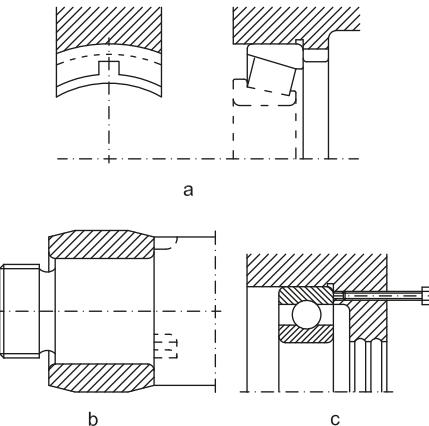


Fig. 7.16

Medium and small-sized bearings which are mounted with an tight fit are dismounted from the shaft by means of a soft steel or copper mandrel or by means of mechanical or hydraulic presses - fig. 7.17, a-c.

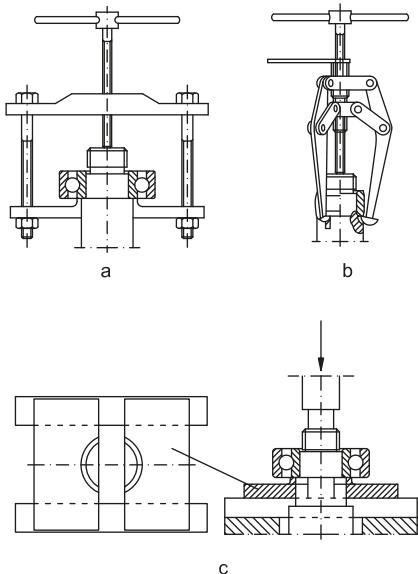


Fig. 7.17

To reduce the frictional force when dismounting largesized bearings which were mounted on shaft with tight fit, pressurized oil should be introduced, as in case of mounting - fig. 7.11.

To dismount bearings with tapered bore which were mounted directly on the shaft or bearings which were mounted with withdrawal or adapter sleeves, the nut axially fastened should be first stripped. Then, dismounting is to be done by light hammering on the inner ring by means of a soft steel or copper mandrel, as shown in fig. 7.18 a and b.

In case of bearings mounted with withdrawal sleeves, a nut is to be screwed up to the threaded part provided for this purpose, as shown in fig. 7.19, a and b.

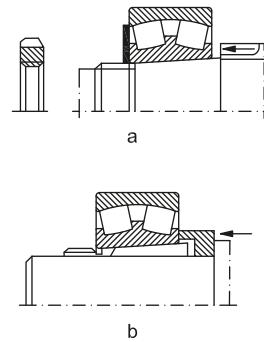


Fig. 7.18

In case of large-sized bearings, hydraulic devices are used as in case of mounting.

Some solutions for dismounting bearings with tapered bore mounted directly on the shaft spindle, with adapter or withdrawal sleeve are given in fig. 7.20, a and b.

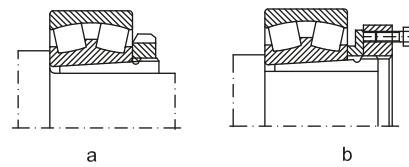


Fig. 7.19

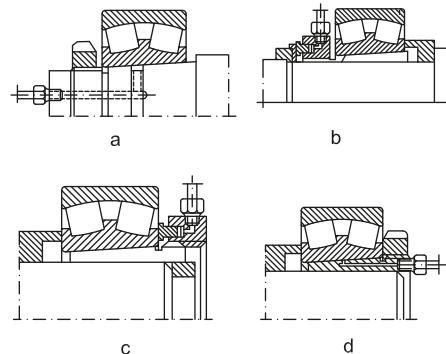


Fig. 7.20

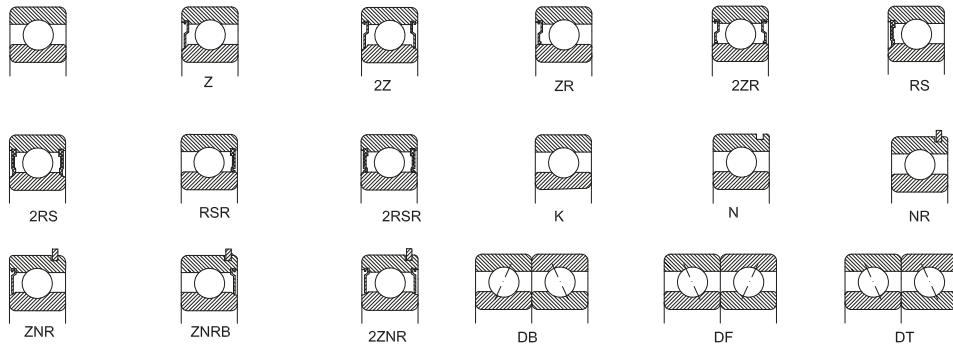


# Deep groove ball bearing

Deep groove ball bearings are manufactured in a varied range, both of standard design and various constructive versions.

Deep groove ball bearings can take double direction radial and axial loads and also allow good operation at high speeds.

For these reasons, they can be widely used. Therefor, single row deep groove ball bearings are manufactured in many constructive versions as shown below.



Besides deep groove ball bearings of basic design, bearings with UG design, with grooves on the outer ring and WL design, with grooves on both rings are also used for the purpose of mounting seals or shields on the bearings. 2ZR, 2RSR or 2RS type, as shown in the bellow figure.



## Suffixes

- A - bearing with extended outer ring
- B - bearing with extended inner ring
- C2 - radial clearance smaller than normal
- C3 - radial clearance larger than normal
- FA - machined cage of steel or cast iron guided in the outer ring
- F2 - constructive modifications

- K - bearing with tapered bore
- M - machined cage of brass guided on the rolling elements
- MA - machined cage of brass guided in the outer ring
- MB - machined cage of brass guided on the inner ring
- N - circular groove for snap ring on the outer ring
- NR - circular groove on the outer ring and snap ring
- P0 - normal tolerance class (it is not marked)
- P6 - tolerance class more accurate than normal
- P63 - tolerance class P6 and radial clearance C3
- P5 - tolerance class more accurate than P6
- P4 - tolerance class more accurate than P5
- R - rib on the outer ring
- RS - bearing with seal on the side, with friction on the inner ring recess

RSA	- bearing with special seal
2RS	- bearing with 2 seals, friction on the inner ring recess
RSR	- bearing with seal on one side, friction on the rib of the inner ring
2RSR	- bearing with 2 seals, friction on the rib of the inner ring
S0	- bearing which can operate up to a temperature of +150°C
S1	- bearing which can operate up to a temperature of +200°C
SP	- snap ring, diameter series 0, 2, 3, 4
SR	- snap ring, diameter series 18 and 19
T30	- bearing which can operate up to a temperature of +300°C, radial clearance 0,20...0,25 mm; phosphate-treated surfaces
TN	- polyamide cage
V	- bearing without cage
Z	- bearing with shield and recess on the inner ring
2Z	- bearing with 2 shields and recess on the inner ring
ZNRB	- bearing with shield and snap ring on the same side
ZR	- bearing with shield, without recess on the inner ring
2ZR	- bearing with 2 shields, without recess on the inner ring

When the outer ring rotates, the lubricant can flow out of the bearing at a certain speed. In such cases, we recommend you to consult our experts.

## Deep groove ball bearings with the snap ring groove

Deep groove ball bearings, with snap ring groove on the outer ring can be located in the housing with snap rings.

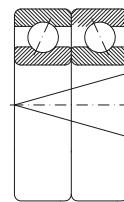
Because of their simple and space saving mounting, these bearings simplify the assembly design. The groove for the snap ring and the snap rings are in accordance with ISO 464 and tables 7 and 8 respectively.

## Paired deep groove ball bearings

If the basic load of a single bearing is inadequate or the shaft has to be axially located in both directions with a certain clearance, paired deep groove ball bearings are recommended to be used.

These bearings can be delivered matched in pairs in three versions, as follows: DT (tandem arrangement), DB (back-to-back arrangement) or DF (face-to-face arrangement). They can be delivered with axial clearance or preloaded. The values of clearance or preload are given in table 2.

The producer marks "V" on the bearing outside surface as shown in the next figure, so that paired bearings to be correctly mounted.



The multiple speed limit of these bearings can be calculated multiplying the speed of the basic bearing by 0,8.

Paired bearings are packed and delivered in the same box.

## Stainless steel deep groove ball bearings

Deep groove ball bearings can be made and constructive version of stainless steel.

## Dimensions

The overall dimensions of deep groove ball bearings are in accordance with the stipulations of ISO 15.

## Misalignments

Deep groove ball bearings have limited abilities to compensate for bearing error of alignment. The permissible misalignment between the outer ring and the inner ring, which will not produce inadmissible high additional loads in the bearing, depends on the bearing size, operational radial clearance, inner bearing design and also on the magnitude of loads and moments acting upon the bearing.

Because of the complex relationship of these influence factors, definite and universally valid values of permissible misalignment cannot be determined.

Considering the above mentioned factors, under normal operation conditions the permissible misalignments are between 2 and 10 minutes of arc, depending on the bearing series and load.

## Tolerances

Deep groove ball bearings are generally manufactured to the normal tolerance class P0.

At request, they can also be manufactured to the tolerance classes P6, P5 or P4.

The values of tolerances are given in chapter 3 on page 26.

## Radial and axial clearance

Deep groove ball bearings are generally manufactured with normal radial clearance. At request, they can also be manufactured with radial clearance different from the normal one, according to ISO 5753. The values of radial clearance are given in table 1.

Paired bearings can be manufactured with axial clearance (suffix A) or preloaded (suffix L). Values for axial clearance and preload are given in table 2.

If a certain axial clearance is prescribed, this has to be measured and marked on the bearing by "A", followed by clearance actual value.

Radial clearance of deep groove ball bearings

Table 1

Bore diameter		Clearance group symbol for bearings with cylindrical bore										
d	over	C2		Normal		C3		C4		C5		
		Clearance group symbol for bearings with tapered bore										
		-	C2	Normal	C3	Normal	C4	C5	C4	C5	C6	
mm		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
<b>2,5</b> <b>10</b>												
<b>10</b>	<b>18</b>	0	7	2	13	8	23	14	29	20	37	
<b>18</b>	<b>24</b>	0	9	3	18	11	25	18	33	25	45	
<b>24</b>	<b>30</b>	0	10	5	20	13	28	20	36	28	48	
<b>30</b>	<b>40</b>	1	11	5	20	13	28	23	41	30	53	
<b>40</b>	<b>50</b>	1	11	6	23	18	36	30	51	45	73	
<b>50</b>	<b>65</b>	1	15	8	28	23	43	38	61	55	90	
<b>65</b>	<b>80</b>	1	15	10	30	25	51	46	71	65	105	
<b>80</b>	<b>100</b>	1	18	12	36	30	58	53	84	75	120	
<b>100</b>	<b>120</b>	2	20	15	41	6	66	61	97	90	140	
<b>120</b>	<b>140</b>	2	23	18	48	41	81	71	114	105	160	
<b>140</b>	<b>160</b>	2	23	18	53	46	91	81	130	120	180	
<b>160</b>	<b>180</b>	2	25	20	61	53	102	91	147	135	200	
<b>180</b>	<b>200</b>	2	30	25	71	63	117	107	163	150	230	
<b>200</b>	<b>225</b>	2	35	25	85	75	140	125	195	175	265	
<b>225</b>	<b>250</b>	2	40	30	95	85	160	145	225	205	300	
<b>250</b>	<b>280</b>	2	45	35	105	90	170	155	245	225	340	
<b>280</b>	<b>315</b>	2	55	40	115	100	190	175	270	245	370	
<b>315</b>	<b>355</b>	3	60	45	125	110	210	195	300	275	410	
<b>355</b>	<b>400</b>	3	70	55	145	130	240	225	340	315	460	

### Axial clearance and mounting preload of paired bearings series 60, 62, 63

Table 2

Bore diameter d	Axial clearance (suffix A)	Preload (suffix L)	Bearing series			
over mm	up to $\mu\text{m}$	min.	max.	60	62	63
-	10	15	35	30	30	-
10	18	20	40	50	50	100
18	30	25	45	100	100	100
30	50	35	55	100	100	200
50	80	40	70	200	200	350
80	120	50	80	300	400	600
120	180	60	100	500	700	900
180	250	70	110	800	1000	1200

### Cages

Deep groove ball bearings are generally fitted with cages of pressed steel sheet.

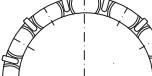
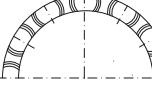
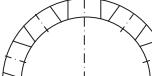
Cages of glass fibre reinforced polyamide 6.6 are also suitable if the operating temperature doesn't exceed +120°C. They have reduced mass, low coefficient of friction and are noiseless in operation. Large-sized bearings are fitted with machined brass cages.

Cage design and some technical data are given in table 3.

### Bearing minimum radial load

A minimum load must be applied on a deep groove ball bearing so that they can operate correctly, especially in case of operating under heavy loads.

The forces of inertia which occur in bearing as well as the friction in lubricant influence negatively the operating conditions and can cause detrimental sliding movements between balls and raceways.

Cage	Design bearing	cage	Application	Max. value $D_m \cdot n$ of	Table 3
Pressed cage of sheet with flns			<ul style="list-style-type: none"> <li>- General application</li> <li>- Bearings with <math>d &gt; 10 \text{ mm}</math></li> <li>- Low frictional moment</li> <li>- Low inertia</li> <li>- Moderate speeds</li> </ul>	$100 \times 10^3$	$550 \times 10^3$
Pressed cage of riveted sheet			<ul style="list-style-type: none"> <li>- General application</li> <li>- Bearings with <math>d &gt; 10 \text{ mm}</math></li> <li>- Low frictional moment</li> <li>- Low Inertia</li> <li>- Moderate speeds</li> </ul>	$1000 \times 10^3$	$550 \times 10^3$
Polyamide cage			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low frictional</li> <li>- High speeds</li> </ul>	$1400 \times 10^3$	$1100 \times 10^3$
Brass machined cage			<ul style="list-style-type: none"> <li>- General application</li> <li>- Bearings:</li> <li>- 61936-618/1400</li> <li>- 61936-619/950</li> <li>- 16036-16072</li> <li>- 6030-60/630</li> <li>- 6230-6248</li> <li>- 6320-6330</li> </ul>	$1000 \times 10^3$	$800 \times 10^3$

Minimum radial load depends on the bearing size, speed and lubricant viscosity at operating temperature. It can be roughly calculated from the equation:

$$F_{r \min} = 0,01 C_r \quad (C_r = \text{basic dynamic radial load}).$$

### Equivalent dynamic radial load

Deep groove ball bearing can take also radial and axial combined loads.

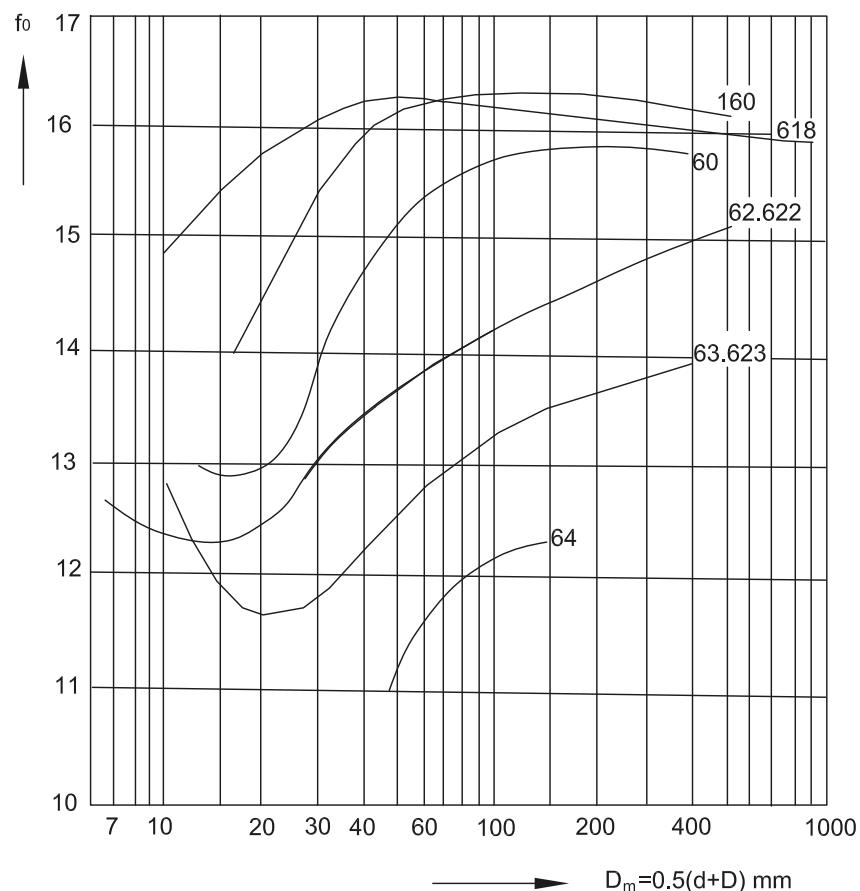
For deep groove ball bearings, single or paired in tandem arrangement DT, equivalent dynamic radial load can be calculated using the equation:

$$\begin{aligned} P_r &= F_r, \text{ kN, when } F_a/F_r < e \\ P_r &= X F_r + Y F_a, \text{ when } F_a/F_r > e \end{aligned}$$

The greater the axial load, the greater the contact angle of these bearings.

Factor  $e$ ,  $X$  and  $Y$  depend on the ratio  $f_0 F_a / C_{0r}$ . Factor  $f_0$  can be determined using the diagram in the bellow figure, as a function of dimension series and mean diameter  $(d+D)/2$ .  $F_a$  is the axial and  $C_{0r}$  is the static basic load of the bearing.

The values of factors  $e$ ,  $X$ ,  $Y$  which depend on the bearing clearance can be determined from table 4, corresponding to the values of the ratio  $f_0 F_a / C_{0r}$ . The values in table 4 apply to bearings mounted with normal fit, i.e. shaft manufactured to tolerance class j5 or k5 and housing in J6, respectively.



**Calculation factors e, X and Z for deep groove ball bearings, single mounted or matched in tandem**

Table 4

f0Fa/C0r	Normal radial clearance			Radial clearance C3			Radial clearance C4		
	e	X	Y	e	X	Y	e	X	Y
<b>0,2</b>	0,19	0,56	2,25	0,32	0,46	1,77	0,38	0,44	1,44
<b>0,4</b>	0,22	0,56	1,95	0,34	0,46	1,63	0,42	0,44	1,36
<b>0,8</b>	0,26	0,56	1,68	0,38	0,46	1,44	0,45	0,44	1,25
<b>1,6</b>	0,31	0,56	1,40	0,43	0,46	1,27	0,48	0,44	1,16
<b>3</b>	0,37	0,56	1,20	0,48	0,46	1,14	0,52	0,44	1,08
<b>6</b>	0,44	0,56	1,02	0,54	0,46	1	0,56	0,44	1

For bearings matched in DB or DT arrangement, equivalent dynamic radial load can be calculated using the equation:

$$P_r = F_r + Y_1 F_a, \text{ kN} \quad \text{when } F_a/F_r < e$$

$$P_r = 0,75F_r + Y_2 F_a, \text{ kN} \quad \text{when } F_a/F_r > e.$$

The values of factors e,  $Y_1$  and  $Y_2$ , as functions of ratio  $F_a/C_{0r}$  are given in table 5.

**Calculation factors e,  $Y_1$ ,  $Y_2$  for DB and DF arrangements**

Table 5

f0Fa/C0r	e	$Y_1$	$Y_2$
<b>0,03</b>	0,32	2	2,8
<b>0,10</b>	0,4	1,55	2,2
<b>0,25</b>	0,47	3	1,65

## Equivalent static radial load

For deep groove ball bearings, single or matched in tandem (DT), equivalent static load can be calculated using the equations:

$$P_0 = F_r, \text{ kN, when } F_a/F_r < 0,8$$

$$P_0 = 0,6F_r + 0,5 F_a, \text{ kN, when } F_a/F_r > 0,8$$

For bearings matched in DB or DF arrangement, it can be calculated from

$$P_0 = F_r + 1,7 F_a, \text{ kN.}$$

## Axial load

If deep groove ball bearings are purely axial loaded, the axial load should not exceed  $0,5 C_{0r}$ . In case of small-sized bearings and bearings of light series (diameter series 8, 9, 0 and 1), the axial load should not exceed  $0,25 C_{0r}$ .

Heavy axial loads cause a significant decrease of bearing rating life. In such cases, we recommend you to consult our experts.

## Abutment dimensions

For a proper location of bearing rings on the shaft shoulder and housing, respectively, maximum shaft (housing) connection radius

**Abutment dimension**

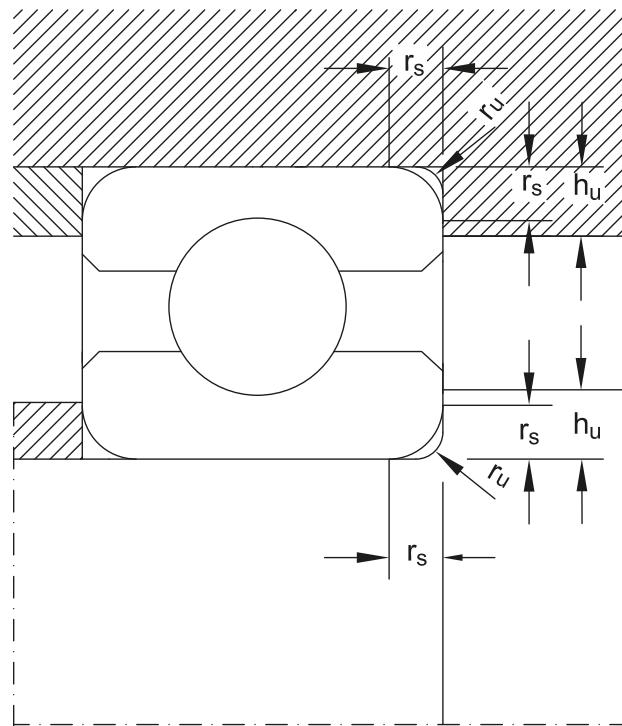
Table 6

	$r_s$ min	$r_u$ max	$h_u$ min	
			Bearing series	
			618,	161, 60,
			619, 160	62, 63
				64
<b>0,15</b>	0,15	0,4	0,7	-
<b>0,2</b>	0,20	0,7	0,9	-
<b>0,3</b>	0,30	1	1,2	-
<b>0,6</b>	0,60	1,6	2,1	-
<b>1</b>	1	2,3	2,8	-
<b>1,1</b>	1	3	3,5	4,5
<b>1,5</b>	1,5	3,5	4,5	5,5
<b>2</b>	2	4,4	5,5	6,5
<b>2,1</b>	2,1	5,1	6	7
<b>3</b>	2,5	6,2	7	8
<b>4</b>	3	7,3	8,5	10
<b>5</b>	4	9	10	12
<b>6</b>	5	11,5	13	15
<b>7,5</b>	6	14	-	-

$r_{u \max}$  should be less than minimum bearing mounting chamfer  $r_{s \min}$ .

The shoulder should have the proper height corresponding to maximum bearing mounting chamfer,

The values of the connection radius ( $r_u$ ) and support shoulder height ( $h_u$ ) as function of mounting chamfers are given in table 6.



## Snap ring groove and snap ring dimensions and tolerances

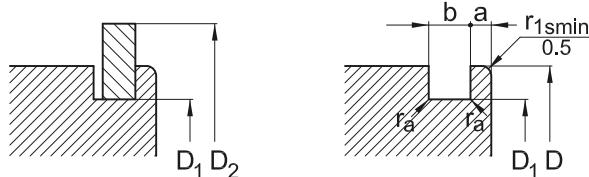


Table 7

### Snap ring groove

Outer diameter D	D <sub>1</sub>		a		Dimensions series		b		r <sub>o</sub>	
	nom.	toler.	nom.	toler.	nom.	toler.	nom.	toler.	nom.	toler.
mm										
22	20,8	- 0,3	-	-	1,05	- 0,15	0,8	+ 0,25	0,2	- 0,1
24	22,8	- 0,3	-	-	1,05	- 0,15	0,8	+ 0,25	0,2	- 0,1
28	26,7	- 0,3	-	-	1,3	- 0,15	0,95	+ 0,25	0,25	- 0,12
30	28,7	- 0,3	-	-	1,3	- 0,15	0,95	+ 0,25	0,25	- 0,12
32	30,7	- 0,3	1,3	- 0,15	-	-	0,95	+ 0,25	0,25	- 0,12
34	32,7	- 0,3	1,3	- 0,15	-	-	0,95	+ 0,25	0,25	- 0,12
37	35,7	- 0,3	1,3	- 0,15	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
39	37,7	- 0,3	-	-	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
40	38,7	- 0,3	1,3	- 0,15	-	-	0,95	+ 0,25	0,25	- 0,12
42	40,7	- 0,3	1,3	- 0,15	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
44	42,7	- 0,3	1,3	- 0,15	-	-	0,95	+ 0,25	0,25	- 0,12
45	43,7	- 0,3	-	-	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
47	45,7	- 0,3	1,3	- 0,15	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
52	50,7	- 0,3	1,3	- 0,15	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
55	53,7	- 0,3	-	-	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
58	56,7	- 0,3	1,3	- 0,15	-	-	0,95	+ 0,25	0,25	- 0,12
62	60,7	- 0,3	-	-	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
65	63,7	- 0,4	1,3	- 0,15	-	-	0,95	+ 0,25	0,25	- 0,12
68	66,7	- 0,4	-	-	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
72	70,7	- 0,4	1,7	- 0,15	1,7	- 0,15	0,95	+ 0,25	0,25	- 0,12
78	76,2	- 0,4	1,7	- 0,15	-	-	1,3	+ 0,3	0,4	- 0,2
80	77,9	- 0,4	-	-	2,1	- 0,2	1,3	+ 0,3	0,4	- 0,2
85	82,9	- 0,4	1,7	- 0,15	2,1	- 0,2	1,3	+ 0,3	0,4	- 0,2
90	87,9	- 0,4	1,7	- 0,15	2,1	- 0,2	1,3	+ 0,3	0,4	- 0,2
95	92,9	- 0,4	1,7	- 0,15	-	-	1,3	+ 0,3	0,4	- 0,2
100	97,9	- 0,4	1,7	- 0,15	2,5	- 0,2	1,3	+ 0,3	0,4	- 0,2
105	102,6	- 0,5	-	-	2,5	- 0,2	1,3	+ 0,3	0,4	- 0,2
110	107,6	- 0,5	2,1	- 0,2	2,5	- 0,2	1,3	+ 0,3	0,4	- 0,2
115	112,6	- 0,5	2,1	- 0,2	-	-	1,3	+ 0,3	0,4	- 0,2
120	117,6	- 0,5	2,1	- 0,2	3,3	- 0,2	1,3	+ 0,3	0,4	- 0,2
125	122,6	- 0,5	2,1	- 0,2	3,3	- 0,2	1,3	+ 0,3	0,4	- 0,2
130	127,6	- 0,5	2,1	- 0,2	3,3	- 0,2	1,3	+ 0,3	0,4	- 0,2
140	137,6	- 0,5	2,5	- 0,2	3,3	- 0,2	1,9	+ 0,3	0,6	- 0,2
145	142,7	- 0,5	-	-	3,3	- 0,2	1,9	+ 0,3	0,6	- 0,3
150	147,6	- 0,5	2,5	- 0,2	3,3	- 0,2	1,9	+ 0,3	0,6	- 0,3
165	161,8	- 0,5	3,3	- 0,2	3,7	- 0,2	1,9	+ 0,3	0,6	- 0,3
175	171,8	- 0,5	3,3	- 0,2	-	-	1,9	+ 0,3	0,6	- 0,3
180	176,8	- 0,5	-	-	3,7	- 0,2	1,9	+ 0,3	0,6	- 0,3
190	186,8	- 0,5	3,3	- 0,2	3,7	- 0,2	1,9	+ 0,3	0,6	- 0,3
200	196,8	- 0,5	3,3	- 0,2	-	-	1,9	+ 0,3	0,6	- 0,3

The outer ring chamfer on the side of snap ring groove should allow a housing connection radius of:  
 0,3 mm for dimensions series 18, up to D = 78 mm included and for dimensions series 19, up to D = 47 mm included;  
 0,5 mm for dimensions series 18, for D > 78 mm and for dimensions series 19, for D > 47 mm

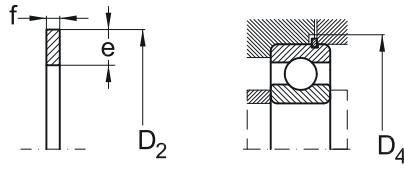


Table 7 (continue)

**Snap ring**

<b>Outer diameter</b>	<b>D<sub>2</sub><sup>1)</sup></b>	<b>D<sub>3</sub><sup>2)</sup></b>		<b>D<sub>4</sub></b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>r</b>	<b>Mass</b>	<b>Snap ring designation</b>
<b>D</b>	max.	nom.	toler.	min.	nom.	nom.	nom.	min.		g
mm										
<b>22</b>	24,8	20,5	- 0,3	25	2	0,7	2	0,2	0,812	<b>SR22</b>
<b>24</b>	26,8	22,5	- 0,3	28	2	0,7	2	0,2	0,886	<b>SR24</b>
<b>28</b>	30,8	26,4	- 0,3	32	2,05	0,85	3	0,2	1,269	<b>SR28</b>
<b>30</b>	32,8	28,3	- 0,3	34	2,05	0,85	3	0,2	1,39	<b>SR30</b>
<b>32</b>	34,8	30,3	- 0,3	36	2,05	0,85	3	0,2	1,483	<b>SR32</b>
<b>34</b>	36,8	32,3	- 0,3	38	2,05	0,85	3	0,2	1,577	<b>SR34</b>
<b>37</b>	39,8	35,3	- 0,3	41	2,05	0,85	3	0,2	1,718	<b>SR37</b>
<b>39</b>	41,8	37,3	- 0,3	43	2,05	0,85	3	0,2	1,811	<b>SR39</b>
<b>40</b>	42,8	38,3	- 0,3	44	2,05	0,85	3	0,2	1,858	<b>SR40</b>
<b>42</b>	44,8	40,3	- 0,4	46	2,05	0,85	3	0,2	1,952	<b>SR42</b>
<b>44</b>	46,8	42,3	- 0,4	48	2,05	0,85	4	0,2	2,032	<b>SR44</b>
<b>45</b>	47,8	43,3	- 0,4	49	2,05	0,85	4	0,2	2,079	<b>SR45</b>
<b>47</b>	49,8	45,3	- 0,4	51	2,05	0,85	4	0,2	2,173	<b>SR47</b>
<b>52</b>	54,8	50,3	- 0,4	56	2,05	0,85	4	0,2	2,407	<b>SR52</b>
<b>55</b>	57,8	53,3	- 0,4	59	2,05	0,85	4	0,2	2,547	<b>SR55</b>
<b>58</b>	60,8	56,3	- 0,6	62	2,05	0,85	4	0,2	2,688	<b>SR58</b>
<b>62</b>	64,8	60,2	- 0,6	66	2,05	0,85	4	0,2	2,938	<b>SR62</b>
<b>65</b>	67,8	63,2	- 0,6	69	2,05	0,85	4	0,2	3,081	<b>SR65</b>
<b>68</b>	70,8	66,2	- 0,6	72	2,05	0,85	5	0,2	3,212	<b>SR68</b>
<b>72</b>	74,8	70,2	- 0,6	76	2,05	0,85	5	0,2	3,403	<b>SR72</b>
<b>78</b>	82,7	75,7	- 0,6	84	3,25	1,12	5	0,4	7,462	<b>SR78</b>
<b>80</b>	84,4	77,4	- 0,6	86	3,25	1,12	5	0,4	7,625	<b>SR80</b>
<b>85</b>	89,4	82,4	- 0,6	91	3,25	1,12	5	0,4	8,105	<b>SR85</b>
<b>90</b>	94,4	87,4	- 0,6	96	3,25	1,12	5	0,4	8,585	<b>SR90</b>
<b>95</b>	99,4	92,4	- 0,6	101	3,25	1,12	5	0,4	9,065	<b>SR95</b>
<b>100</b>	104,4	97,4	- 0,6	106	3,25	1,12	5	0,4	9,545	<b>SR100</b>
<b>105</b>	110,7	101,9	- 0,8	112	4,04	1,12	5	0,4	12,653	<b>SR105</b>
<b>110</b>	115,7	106,9	- 0,8	117	4,04	1,12	5	0,4	13,257	<b>SR110</b>
<b>115</b>	120,7	111,9	- 0,8	122	4,04	1,12	5	0,4	13,861	<b>SR115</b>
<b>120</b>	125,7	116,9	- 0,8	127	4,04	1,12	7	0,4	14,393	<b>SR120</b>
<b>125</b>	130,7	121,8	- 0,8	132	4,04	1,12	7	0,4	15,164	<b>SR125</b>
<b>130</b>	135,7	126,8	- 0,8	137	4,04	1,12	7	0,4	15,774	<b>SR130</b>
<b>140</b>	145,7	136,8	- 1	147	4,04	1,7	7	0,4	25,796	<b>SR140</b>
<b>145</b>	150,7	141,8	- 1	152	4,04	1,7	7	0,6	26,722	<b>SR145</b>
<b>150</b>	155,7	146,8	- 1,2	157	4,04	1,7	7	0,6	27,648	<b>SR150</b>
<b>165</b>	171,5	161	- 1,2	173	4,85	1,7	7	0,6	35,89	<b>SR165</b>
<b>175</b>	181,5	171	- 1,2	183	4,85	1,7	10	0,6	37,883	<b>SR175</b>
<b>180</b>	186,5	176	- 1,2	187	4,85	1,7	10	0,6	38,976	<b>SR180</b>
<b>190</b>	196,5	186	- 1,4	198	4,85	1,7	10	0,6	41,162	<b>SR190</b>
<b>200</b>	206,5	196	- 1,4	208	4,85	1,7	10	0,6	43,348	<b>SR200</b>

1) D<sub>2</sub> dimensions refers to the mounted snap ring2) D<sub>3</sub> represents dimensions before mounting

## Snap ring groove and snap ring dimensions and tolerances

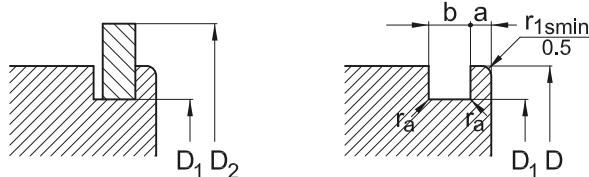


Table 8

### Snap ring groove

Outer diameter D	D <sub>1</sub> mm	a 60 nom.	Dimensions series		b nom.	r <sub>0</sub> nom.	toler. nom.
			62, 63, 64 nom.	toler.			
<b>mm</b>							
<b>30</b>	28,17	- 0,25				- 0,3	
<b>32</b>	30,15	- 0,25	2	- 0,15	1,35	+ 0,3	0,4
<b>35</b>	33,17	- 0,25	2	- 0,15	1,35	+ 0,3	0,4
<b>40</b>	38,10	- 0,25				- 0,2	
<b>42</b>	39,75	- 0,25	2	- 0,15	1,35	+ 0,3	0,4
<b>47</b>	44,60	- 0,25	2	- 0,15	0,35	+ 0,3	0,4
<b>52</b>	49,73	- 0,25	2	- 0,15	1,35	+ 0,3	0,4
<b>55</b>	52,60	- 0,25	2			- 0,2	
<b>62</b>	59,61	- 0,5	2,08	- 0,2	3,28	- 0,2	1,90
<b>68</b>	64,82	- 0,5	2,49	- 0,2	3,28	- 0,2	1,90
<b>72</b>	68,81	- 0,5			3,28	- 0,2	1,90
<b>75</b>	71,83	- 0,5	2,49	- 0,2	3,28	- 0,2	1,90
<b>80</b>	76,81	- 0,5	2,49	- 0,2	3,28	- 0,2	1,90
<b>85</b>	81,81	- 0,5			3,28	- 0,2	1,90
<b>90</b>	86,79	- 0,5	2,87	- 0,2	3,28	- 0,2	2,70
<b>95</b>	91,82	- 0,5			2,87	- 0,2	2,70
<b>100</b>	96,80	- 0,5	2,87	- 0,2	3,28	- 0,2	2,70
<b>110</b>	106,81	- 0,5	2,87	- 0,2	3,28	- 0,2	2,70
<b>115</b>	111,81	- 0,5	2,87	- 0,2			2,70
<b>120</b>	115,21	- 0,5			4,06	- 0,2	3,10
<b>125</b>	120,22	- 0,5	2,87	- 0,2	4,06	- 0,2	3,10
<b>130</b>	125,22	- 0,5	2,87	- 0,2	4,06	- 0,2	3,10
<b>140</b>	135,23	- 0,5	3,71	- 0,25	4,90	- 0,25	3,10
<b>145</b>	140,23	- 0,5	3,71	- 0,25			3,10
<b>150</b>	145,24	- 0,5	3,71	- 0,25	4,90	- 0,25	3,10
<b>160</b>	155,22	- 0,5	3,71	- 0,25	4,90	- 0,25	3,10
<b>170</b>	163,65	- 0,5	3,71	- 0,25	5,69	- 0,25	3,50
<b>180</b>	173,66	- 0,5	3,71	- 0,25	5,69	- 0,25	3,50
<b>200</b>	193,65	- 0,5	5,69	- 0,25	5,69	- 0,25	3,50
						+ 0,3	0,6
						- 0,3	

The outer ring chamfer on the side of snap ring groove should allow a housing connection radius of:  
 0,3 mm for dimensions series 18, up to D = 78 mm included and for dimensions series 19, up to D = 47 mm included;  
 0,5 mm for dimensions series 18, for D > 78 mm and for dimensions series 19, for D > 47 mm

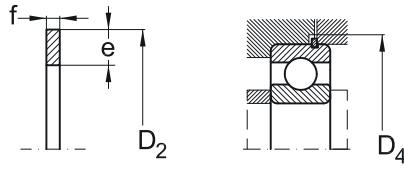


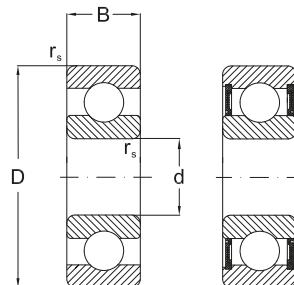
Table 8 (continue)

**Snap ring**

<b>Outer diameter</b>	<b>D<sub>2</sub><sup>1)</sup></b>	<b>D<sub>3</sub><sup>2)</sup></b>		<b>D<sub>4</sub></b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>r</b>	<b>Mass</b>	<b>Snap ring designation</b>
<b>D</b>	max.	nom.	toler.	min.	nom.	nom.	nom.	min.		g
mm										
<b>30</b>	34,7	27,9	- 0,4	36	3,25	1,12	3	0,4	2,78	<b>SP30</b>
<b>32</b>	36,7	29,9	- 0,4	38	3,25	1,12	3	0,4	2,98	<b>SP32</b>
<b>35</b>	39,7	32,9	- 0,4	41	3,25	1,12	3	0,4	3,22	<b>SP35</b>
<b>40</b>	44,6	37,8	- 0,4	46	3,25	1,12	3	0,4	3,60	<b>SP40</b>
<b>42</b>	46,3	39,5	- 0,5	47	3,25	1,12	3	0,4	3,75	<b>SP42</b>
<b>47</b>	52,7	44,3	- 0,5	54	4,04	1,12	4	0,4	5,30	<b>SP47</b>
<b>52</b>	57,9	49,4	- 0,5	59	4,04	1,12	4	0,4	5,92	<b>SP52</b>
<b>55</b>	60,7	52,3	- 0,5	62	4,04	1,12	4	0,4	6,17	<b>SP55</b>
<b>62</b>	67,7	59,0	- 0,6	69	4,04	1,70	4	0,6	10,5	<b>SP62</b>
<b>68</b>	74,6	64,2	- 0,6	76	4,85	1,70	5	0,6	12,6	<b>SP68</b>
<b>72</b>	78,6	68,2	- 0,6	80	4,85	1,70	5	0,6	14,7	<b>SP72</b>
<b>75</b>	81,6	71,2	- 0,6	83	4,85	1,70	5	0,6	15,3	<b>SP75</b>
<b>80</b>	86,6	76,2	- 0,6	88	4,85	1,70	5	0,6	16,3	<b>SP80</b>
<b>85</b>	91,6	81,2	- 0,6	93	4,85	1,70	5	0,6	17,5	<b>SP85</b>
<b>90</b>	96,5	86,2	- 0,6	98	4,85	2,46	5	0,6	26,6	<b>SP90</b>
<b>95</b>	101,6	91,2	- 0,6	103	4,85	2,46	5	0,6	28,2	<b>SP95</b>
<b>100</b>	106,5	96,2	- 0,8	108	4,85	2,46	5	0,6	29,2	<b>SP100</b>
<b>110</b>	116,6	106,2	- 0,8	118	4,85	2,46	5	0,6	32,8	<b>SP110</b>
<b>115</b>	121,6	111,2	- 0,8	123	4,85	2,46	5	0,6	34,4	<b>SP115</b>
<b>120</b>	129,7	114,6	- 0,8	131	7,21	2,82	7	0,6	60,6	<b>SP120</b>
<b>125</b>	134,7	119,6	- 0,8	136	7,21	2,82	7	0,6	63,0	<b>SP125</b>
<b>130</b>	139,7	124,6	- 0,8	141	7,21	2,82	7	0,6	65,6	<b>SP130</b>
<b>140</b>	149,7	134,6	- 1,2	151	7,21	2,82	7	0,6	70,6	<b>SP140</b>
<b>145</b>	154,7	139,6	- 1,2	156	7,21	2,82	7	0,6	73,0	<b>SP145</b>
<b>150</b>	159,7	144,5	- 1,2	161	7,21	2,82	7	0,6	77,2	<b>SP150</b>
<b>160</b>	169,7	154,5	- 1,2	172	7,21	2,82	7	0,6	81,0	<b>SP160</b>
<b>170</b>	182,9	162,9	- 1,2	185	9,60	3,10	10	0,6	122	<b>SP170</b>
<b>180</b>	192,9	172,8	- 1,2	195	9,60	3,10	10	0,6	128	<b>SP180</b>
<b>200</b>	212,9	192,8	- 1,4	215	9,60	3,10	10	0,6	148	<b>SP200</b>

1) D<sub>2</sub> dimensions refers to the mounted snap ring  
 2) D<sub>3</sub> represents dimensions before mounting

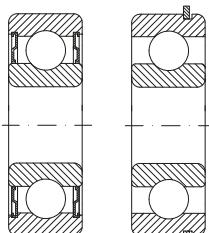
## Single Row Deep Groove Ball Bearings



2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>3</b>	10	4	0,1	0,64	0,23	40000	48000	<b>623</b>	0,002
	10	4	0,1	0,64	0,23	40000		<b>623 2ZR</b>	0,002
<b>4</b>	13	5	0,2	1,3	0,49	38000	45000	<b>624</b>	0,003
	13	5	0,2	1,3	0,49	38000		<b>624 2ZR</b>	0,003
	16	5	0,3	1,2	0,5	34000	40000	<b>634</b>	0,005
	16	5	0,3	1,2	0,5	34000		<b>634 2ZR</b>	0,005
<b>5</b>	11	3	0,1	0,64	0,26	55000	65000	<b>618/5</b>	0,001
	16	5	0,3	1,9	0,69	34000	40000	<b>625</b>	0,005
	16	5	0,3	1,9	0,69	34000		<b>625 2ZR</b>	0,005
	16	5	0,3	1,9	0,69	22000		<b>625 2RSR</b>	0,005
	19	6	0,3	1,7	0,72	32000	38000	<b>635</b>	0,009
	19	6	0,3	1,7	0,72	32000		<b>635 2ZR</b>	0,009
<b>6</b>	13	3,5	0,1	1	0,44	50000	59000	<b>618/6</b>	0,002
	15	5	0,2	1,45	0,6	47000	56000	<b>619/6</b>	0,004
	19	6	0,3	2,2	0,89	32000	38000	<b>626</b>	0,008
	19	6	0,3	2,2	0,89	32000		<b>626 2ZR</b>	0,008
	19	6	0,3	2,2	0,89	22000		<b>626 2RSR</b>	0,008
<b>7</b>	14	3,5	0,1	0,96	0,4	47000	56000	<b>618/7</b>	0,002
	17	5	0,3	2,1	0,8	44000	51000	<b>619/7Y</b>	0,005
	19	6	0,3	2,25	0,89	32000	38000	<b>607</b>	0,008
	19	6	0,3	2,25	0,89	32000		<b>607 2ZR</b>	0,008
	19	6	0,3	2,25	0,89	22000		<b>607 2RSR</b>	0,008
	22	7	0,3	3,3	1,35	30000	36000	<b>627</b>	0,012
	22	7	0,3	3,3	1,35	30000		<b>627 2ZR</b>	0,012
	22	7	0,3	3,3	1,35	20000		<b>627 2RSR</b>	0,012
<b>8</b>	16	4	0,2	1,35	0,57	44000	51000	<b>618/8</b>	0,003
	19	6	0,3	1,6	0,74	40000	47000	<b>619/8</b>	0,007
	22	7	0,3	3,3	1,35	30000	36000	<b>608</b>	0,015
	22	7	0,3	3,3	1,35	30000		<b>608 2ZR</b>	0,015
	22	7	0,3	3,3	1,35	20000		<b>608 2RSR</b>	0,015
<b>9</b>	17	4	0,2	1,45	0,64	40000	47000	<b>618/9</b>	0,003
	20	6	0,3	2,65	1,1	37000	43000	<b>619/9</b>	0,007
	24	7	0,3	3,35	1,4	30000	36000	<b>609</b>	0,018
	24	7	0,3	3,35	1,4	30000		<b>609 2ZR</b>	0,018
	24	7	0,3	3,35	1,4	20000		<b>609 2RSR</b>	0,018

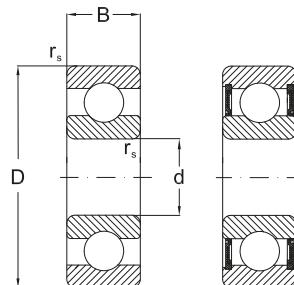
## Single Row Deep Groove Ball Bearings



2ZR                    NR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>9</b>	26	8	0,3	4,55	1,95	28000	34000	<b>629</b>	0,020
	26	8	0,3	4,55	1,95	26000		<b>629 2ZR</b>	0,020
	26	8	0,3	4,55	1,95	18000		<b>629 2RSR</b>	0,020
<b>10</b>	19	5	0,3	1,7	0,83	37000	43000	<b>61800</b>	0,005
	22	6	0,3	1,95	0,75	34000	41000	<b>61900 TN</b>	0,010
	26	8	0,3	4,6	1,95	28000	34000	<b>6000 TN</b>	0,020
	26	8	0,3	4,6	1,95	28000		<b>6000 2ZR</b>	0,020
	26	8	0,3	4,6	1,95	17000		<b>6000 2RSR</b>	0,020
	28	8	0,3	4,6	1,95	28000	34000	<b>16100</b>	0,023
	30	9	0,6	5,1	2,4	32000	38000	<b>6200 TN</b>	0,032
	30	9	0,6	5,1	2,4	26000		<b>6200 2ZR</b>	0,032
	30	9	0,6	5,1	2,4	17000		<b>6200 2RSR</b>	0,032
	35	11	0,6	8,1	3,45	20000	26000	<b>6300</b>	0,057
	35	11	0,6	8,2	3,5	20000		<b>6300 2ZR</b>	0,057
	35	11	0,6	8,2	3,5	15000		<b>6300 2RSR</b>	0,057
<b>12</b>	21	5	0,3	1,8	0,95	33000	39000	<b>61801</b>	0,006
	21	5	0,3	1,45	0,67	33000	39000	<b>61801 NR</b>	<b>SR21</b> 0,006
	24	6	0,3	2,9	1,45	31000	36000	<b>61901</b>	0,011
	24	6	0,3	2,9	1,45	31000	36000	<b>61901 NR</b>	<b>SR24</b> 0,011
	28	8	0,3	5,1	2,4	26000	32000	<b>6001</b>	0,022
	28	8	0,3	5,1	2,4	26000	32000	<b>6001 TN</b>	0,022
	28	8	0,3	5,1	2,4	26000		<b>6001 2ZR</b>	0,022
	28	8	0,3	5,1	2,4	17000		<b>6001 2RSR</b>	0,022
	30	8	0,3	5,1	2,4	26000	32000	<b>16101</b>	0,026
	32	10	0,6	6,9	3,1	22000	28000	<b>6201</b>	0,037
	32	10	0,6	6,9	3,1	22000	28000	<b>6201 TN</b>	0,037
	32	10	0,6	6,9	3,1	22000		<b>6201 2ZR</b>	0,037
	32	10	0,6	6,9	3,1	15000		<b>6201 2RSR</b>	0,037
	32	14	0,6	6,9	3,1	22000		<b>62201 2RSR</b>	0,049
	37	12	1	9,8	4,2	19000	24000	<b>6301</b>	0,065
	37	12	1	9,8	4,2	19000		<b>6301 2ZR</b>	0,065
	37	12	1	9,8	4,2	12000		<b>6301 2RSR</b>	0,065
<b>15</b>	24	5	0,3	2	1,25	28000	33000	<b>61802</b>	0,007
	24	5	0,3	2	1,25	28000	33000	<b>61802 NR</b>	<b>SR24</b> 0,007
	28	7	0,3	4	2,05	26000	30000	<b>61902</b>	0,017

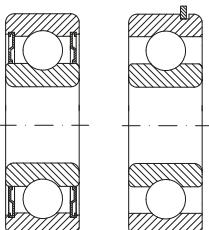
## Single Row Deep Groove Ball Bearings



2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass	
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil	bearing	snap ring	
mm				kN		min <sup>-1</sup>		-	kg	
<b>15</b>	28	7	0,3	4	2,05	26000	30000	<b>61902 NR</b>	<b>SR28</b>	0,017
	30	8	0,3	4	2,05	22000	28000	<b>16002</b>		0,037
	32	9	0,3	5,6	2,9	22000	28000	<b>6002</b>		0,031
	32	9	0,3	5,6	2,9	22000		<b>6002 2ZR</b>		0,031
	32	9	0,3	5,6	2,9	14000		<b>6002 2RSR</b>		0,031
	35	11	0,6	7,8	3,8	19000	24000	<b>6202</b>		0,046
	35	11	0,6	7,8	3,8	19000		<b>6202 2ZR</b>		0,046
	35	11	0,6	7,65	3,75	19000	24000	<b>6202 TN</b>		0,046
	35	11	0,6	7,8	3,8	13000		<b>6202 2RSR</b>		0,146
	35	14	0,6	7,8	3,8	13000		<b>62202 2RSR</b>		0,053
	42	13	1	11,5	5,5	17000	20000	<b>6302</b>		0,092
	42	13	1	11,5	5,5	17000		<b>6302 2ZR</b>		0,092
	42	13	1	11,5	5,5	11000		<b>6302 2RSR</b>		0,092
	42	17	1	11,5	5,5	17000		<b>62302 2RSR</b>		0,099
<b>17</b>	26	5	0,3	2,2	1,4	26000	32000	<b>61803</b>		0,009
	30	7	0,3	4,35	2,3	26000	32000	<b>61903</b>		0,018
	35	8	0,3	6	3,25	20000	26000	<b>16003</b>		0,040
	35	10	0,3	6	3,3	20000	26000	<b>6003</b>		0,042
	35	10	0,3	6	3,3	20000		<b>6003 2ZR</b>		0,042
	35	10	0,3	6	3,3	12000		<b>6003 2RSR</b>		0,042
	40	12	0,6	9,6	4,8	17000	20000	<b>6203</b>		0,070
	40	12	0,6	9,6	4,8	17000	20000	<b>6203 TN</b>		0,070
	40	12	0,6	9,6	4,8	17000		<b>6203 2ZR</b>		0,070
	40	12	0,6	9,6	4,8	11000		<b>6203 2RSR</b>		0,070
	40	12	0,6	9,6	4,8	17000	20000	<b>6203 NR</b>	<b>SP40</b>	0,070
	40	16	1	9,55	4,8	17000	20000	<b>62203 2RSR</b>		0,082
	47	14	1	13,7	6,7	16000	19000	<b>6303</b>		0,120
	47	14	1	13,7	6,7	16000		<b>6303 2ZR</b>		0,120
	47	14	1	13,7	6,7	11000		<b>6303 2RSR</b>		0,120
	47	19	1	13,4	6,55	16000		<b>62303 2RSR</b>		0,145
	62	17	1,1	22,7	11	12000	15000	<b>6403</b>		0,285
	62	17	1,1	22,7	11	12000	15000	<b>6403 NR</b>	<b>SP62</b>	0,285
<b>20</b>	32	7	0,3	3,45	2,25	20000	26000	<b>61804</b>		0,020
	32	7	0,3	3,45	2,25	21000	25000	<b>61804 NR</b>	<b>SR32</b>	0,020
	37	9	0,3	6,55	3,65	19000	23000	<b>61904</b>		0,036

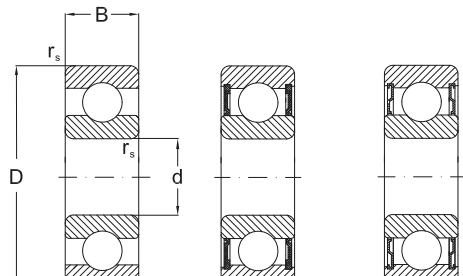
## Single Row Deep Groove Ball Bearings



2ZR                    NR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	bearing	snap ring
mm				kN		min <sup>-1</sup>		-	kg
<b>20</b>	37	9	0,3	6,55	3,65	19000	23000	<b>61904 NR</b>	<b>SR37</b>
	42	8	0,3	7,95	4,5	17000	20000	<b>16004</b>	0,050
	42	12	0,6	9,4	5,1	17000	20000	<b>6004</b>	0,070
	42	12	0,6	9,4	5,1	17000		<b>6004 2ZR</b>	0,070
	42	12	0,6	9,4	5,1	11000		<b>6004 2RSR</b>	0,070
	47	14	1	12,8	6,7	15000	18000	<b>6204</b>	0,118
	47	14	1	12,8	6,7	15000	18000	<b>6204 TN</b>	0,118
	47	14	1	12,8	6,7	15000		<b>6204 2ZR</b>	0,118
	47	14	1	12,8	6,7	10000		<b>6204 2RSR</b>	0,118
	47	14	1	12,8	6,7	15000	18000	<b>6204 NR</b>	<b>SP47</b> 0,118
	47	18	1	12,8	6,7	15000		<b>62204 2RSR</b>	0,131
	52	15	1,1	15,9	7,9	13000	16000	<b>6304</b>	0,158
	52	15	1,1	15,9	7,9	13000	16000	<b>6304 TN</b>	0,158
	52	15	1,1	15,9	7,9	13000	16000	<b>6304 MAP5</b>	0,158
	52	15	1,1	15,9	7,9	13000		<b>6304 2ZR</b>	0,158
	52	15	1,1	15,9	7,9	8000		<b>6304 2RSR</b>	0,158
	52	15	1,1	15,9	7,9	13000	16000	<b>6304 NR</b>	<b>SP52</b> 0,158
	52	21	1,1	15,9	7,9	13000		<b>62304 2RSR</b>	0,197
	72	19	1,1	31	15,2	10000	13000	<b>6404</b>	0,420
<b>22</b>	50	14	1	12,9	6,8	15000	17000	<b>62/22</b>	0,118
	50	14	1	12,9	6,8	15000		<b>62/22 2ZR</b>	0,118
	50	14	1	12,9	6,8	15000		<b>62/22 2RSR</b>	0,118
	56	16	1,1	18,5	9,5	13000	15000	<b>63/22</b>	0,201
	56	16	1,1	18,5	9,5	13000		<b>63/22 2ZR</b>	0,201
	56	16	1,1	18,5	9,5	13000		<b>63/22 2RSR</b>	0,201
<b>25</b>	37	7	0,3	4,35	2,6	18000	25000	<b>61805</b>	0,022
	42	9	0,3	6,65	4,1	16000	19000	<b>61905</b>	0,041
	47	8	0,3	8,4	5,1	15000	18000	<b>16005</b>	0,058
	47	12	0,6	10,1	5,9	15000	18000	<b>6005 TN</b>	0,086
	47	12	0,6	10,1	5,9	15000		<b>6005 2ZR</b>	0,086
	47	12	0,6	10,1	5,9	9500		<b>6005 2RSR</b>	0,086
	52	15	1	14	7,9	12000	15000	<b>6205</b>	0,142
	52	15	1	14	7,9	12000		<b>6205 2ZR</b>	0,142
	52	15	1	14	7,9	8000		<b>6205 2RSR</b>	0,142
	52	15	1	14	7,9	12000	15000	<b>6205 NR</b>	<b>SP52</b> 0,142

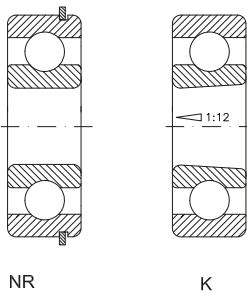
## Single Row Deep Groove Ball Bearings



2RSR                    2ZR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil	bearing	snap ring
mm				kN		min <sup>-1</sup>		-	kg
<b>25</b>	52	18	1	14	7,9	12000		<b>62205 2RSR</b>	0,148
	62	17	1,1	20,6	11,3	11000	14000	<b>6305</b>	0,250
	62	17	1,1	20,6	11,3	11000	14000	<b>6305 MAP5</b>	0,250
	62	17	1,1	20,6	11,3	11000		<b>6305 2ZR</b>	0,250
	62	17	1,1	20,6	11,3	7500		<b>6305 2RSR</b>	0,250
	62	17	1,1	20,6	11,3	11000	14000	<b>6305 NR</b>	<b>SP62</b>
	62	24	1,1	20,6	11,3	11000		<b>62305 2RSR</b>	
	80	21	1,5	37,6	19	9000	11000	<b>6405</b>	0,575
	80	21	1,5	37,6	19	9000	11000	<b>6405 NR</b>	<b>SP80</b> 0,575
<b>28</b>	58	16	1	10,7	6,65	14000	16000	<b>62/28</b>	0,173
	58	16	1	10,7	6,65	14000		<b>62/28 2ZR</b>	0,173
	58	16	1	10,7	6,65	14000		<b>62/28 RSR</b>	0,173
	68	18	1,1	19,5	11,5	10000	12000	<b>63/28</b>	0,328
	68	18	1,1	19,5	11,5	10000		<b>63/28 2ZR</b>	0,328
	68	18	1,1	19,5	11,5	10000		<b>63/28 RSR</b>	0,328
<b>30</b>	42	7	0,3	4,4	2,9	15000	18000	<b>61806</b>	0,027
	42	7	0,3	4,4	2,9	15000	18000	<b>61806 NR</b>	<b>SR42</b>
	47	9	0,3	7,8	4,7	14000	17000	<b>61906</b>	
	47	9	0,3	7,8	4,7	14000	17000	<b>61906 NR</b>	<b>SR47</b>
	55	9	3	11,2	7,35	12000	15000	<b>16006</b>	0,087
	55	13	1	13,2	8,25	12000	15000	<b>6006 TN</b>	0,129
	55	13	1	13,2	8,25	12000		<b>6006 2ZR</b>	0,129
	55	13	1	13,2	8,25	7000		<b>6006 2RSR</b>	0,129
	55	13	1	13,2	8,25	12000	15000	<b>6006 NR</b>	<b>SP55</b>
	62	16	1	19,5	11,3	10000	13000	<b>6206</b>	
	62	16	1	19,5	11,3	10000		<b>6206 2ZR</b>	0,210
	62	16	1	19,5	11,3	7500		<b>6206 2RSR</b>	0,210
	62	16	1	19,5	11,3	10000	13000	<b>6206 NR</b>	<b>SP62</b>
	62	20	1	19,5	11,3	10000		<b>62206 2RSR</b>	
	72	19	1,1	29,5	15,8	9000	11000	<b>6306</b>	0,371
	72	19	1,1	29,5	15,8	9000	11000	<b>6306 MAP5</b>	0,371
	72	19	1,1	29,5	15,8	9000		<b>6306 2ZR</b>	0,371
	72	19	1,1	29,5	15,8	6000		<b>6306 2RSR</b>	0,371
	72	19	1,1	29,5	15,8	9000	11000	<b>6306 NR</b>	<b>SP72</b>
	72	27	1,1	26,6	14,9	9000		<b>62306 2RSR</b>	

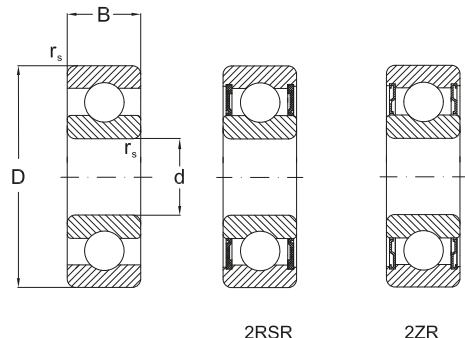
## Single Row Deep Groove Ball Bearings



NR                                    K

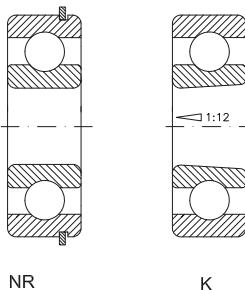
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	bearing	snap ring
mm				kN		min <sup>-1</sup>		-	kg
<b>30</b>	90	23	1,5	47,3	24,5	8500	10000	<b>6406</b>	
	90	23	1,5	47,3	24,5	8500	10000	<b>6406 NR</b>	<b>SP90</b>
<b>32</b>	65	17	1	23	13	10000	12000	<b>62/32</b>	0,228
	65	17	1	23	13	10000		<b>62/32 2ZR</b>	0,228
	65	17	1	23	13	10000		<b>62/32 2RSR</b>	0,228
	75	20	1,1	30	16	9000	11000	<b>63/32</b>	0,437
	75	20	1,1	30	16	9000		<b>63/32 2ZR</b>	0,437
	75	20	1,1	30	16	9000		<b>63/32 2RSR</b>	0,437
<b>35</b>	47	7	0,3	4	3,25	13000	16000	<b>61807</b>	0,031
	55	10	0,6	9,5	6,2	12000	14000	<b>61907</b>	0,073
	62	9	0,3	12,2	8,85	10000	13000	<b>16007</b>	0,111
	62	14	1	15,9	10,3	10000	13000	<b>6007</b>	0,164
	62	14	1	15,9	10,3	7000		<b>6007 2ZR</b>	0,164
	62	14	1	15,9	10,3	10000	13000	<b>6007 2RSR</b>	0,164
	72	17	1,1	25,7	15,6	9000	11000	<b>6207 K</b>	0,315
	72	17	1,1	25,7	15,4	9000	11000	<b>6207 TN</b>	0,315
	72	17	1,1	25,7	15,4	9000	11000	<b>6207 MAP6</b>	0,315
	72	17	1,1	25,7	15,4	9000	11000	<b>6207 P6</b>	0,315
	72	17	1,1	25,7	15,4	9000	11000	<b>6207 P5</b>	0,315
	72	17	1,1	25,7	15,6	9000		<b>6207 2ZR</b>	0,315
	72	17	1,1	25,7	15,6	6000		<b>6207 2RSR</b>	0,315
	72	17	1,1	25,7	15,6	9000	11000	<b>6207 NR</b>	<b>SP72</b> 0,315
	72	17	1,1	25,7	15,6	9000	11000	<b>6207 NRP6</b>	<b>SP72</b> 0,315
	72	17	1,1	25,7	15,6	9000	11000	<b>6207 MA</b>	0,315
	72	23	1,1	25,7	15,6	9000		<b>62207 2RSR</b>	0,375
	80	21	1,5	33,5	19,2	8500	10000	<b>6307</b>	0,450
	80	21	1,5	33,5	19,2	8500	10000	<b>6307 K</b>	0,450
	80	21	1,5	33,5	19,2	8500	10000	<b>6307 P6</b>	0,450
	80	21	1,5	33,5	19,2	8500	10000	<b>6307 P5</b>	0,450
	80	21	1,5	33,5	19,2	8500		<b>6307 2ZR</b>	0,450
	80	21	1,5	33,5	19,2	8500		<b>6307 2ZRP5</b>	0,450
	80	21	1,5	33,5	19,2	6500		<b>6307 2RSR</b>	0,450
	80	21	1,5	33,5	19,2	6500		<b>6307 2RSRP6</b>	0,450
	80	21	1,5	33,5	19,2	6500		<b>6307 2RSRPS</b>	0,450

## Single Row Deep Groove Ball Bearings



Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>35</b>	80	31	1,5	33,5	19,2	8500	10000	<b>6307 NR</b>	<b>SP80</b>
	80	31	1,5	33,5	19,2	8500	10000	<b>62307 2RSR</b>	0,658
	100	25	1,5	55,5	29,4	7000	8500	<b>6407</b>	0,954
	100	25	1,5	55,5	29,4	7000	8500	<b>6407 NR</b>	<b>SP100</b> 0,954
<b>40</b>	52	7	0,3	4,5	4,05	11000	14000	<b>61808 P5</b>	0,034
	52	7	0,3	4,5	4,05	12000	14000	<b>61808 NR</b>	<b>SR52</b> 0,034
	62	12	0,6	14,5	10,2	11000	13000	<b>61908</b>	0,110
	62	12	0,6	14,5	10,2	11000	13000	<b>61908 NR</b>	<b>SR62</b> 0,110
	68	9	0,3	13,3	9,8	95000	12000	<b>16008</b>	0,130
	68	15	1	16,8	11,6	9500	12000	<b>6008</b>	0,210
	68	15	1	16,8	11,6	9500	12000	<b>6008 2ZR</b>	0,210
	68	15	1	16,8	11,6	6000	6000	<b>6008 2RSR</b>	0,210
	68	15	1	16,8	11,6	9500	12000	<b>6008 NR</b>	<b>SP68</b> 0,210
	80	18	1,1	32,6	20	8500	10000	<b>6208</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 K</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 P6</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 P5</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 2ZR</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 2ZRP5</b>	0,402
	80	18	1,1	32,6	20	5600	5600	<b>6208 2RSR</b>	0,402
	80	18	1,1	32,6	20	5600	5600	<b>6208 2RSRP5</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 NR</b>	<b>SP80</b> 0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 MB</b>	0,402
	80	18	1,1	32,6	20	8500	10000	<b>6208 NMA</b>	0,402
	80	23	1,1	32	19,8	8500	10000	<b>62208 2RSR</b>	0,460
	90	23	1,5	40,8	24	7500	9000	<b>6308</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 K</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 TN</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 P6</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 P5</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 2ZR</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 2ZRP5</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 2RSR</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 NMA</b>	0,635
	90	23	1,5	40,8	24	7500	9000	<b>6308 NR</b>	<b>SP90</b> 0,635

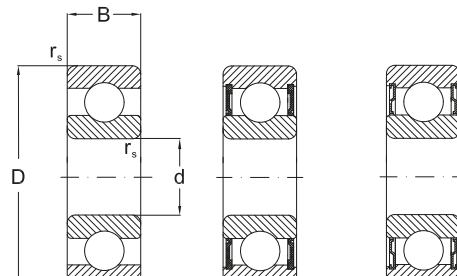
# **Single Row Deep Groove Ball Bearings**



NR K

Dimensions				Basical radial load		Speed limit		Designation		Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	bearing	snap ring	
mm				kN		min <sup>-1</sup>		-		kg
<b>40</b>	90	33	1,5	40,8	24	7500		<b>62308 2RSR</b>		0,874
	110	27	2	64	35	6700	7500	<b>6408</b>		1,23
	110	27	2	64	35	6700	8000	<b>6408 NR</b>	<b>SP110</b>	1,23
<b>45</b>	58	7	0,3	6,4	5,6	9500	12000	<b>61809</b>		0,043
	68	12	0,6	14	9,8	9700	11000	<b>61909</b>		0,120
	75	10	0,6	15,5	12,3	9000	11000	<b>16009</b>		0,170
	75	16	1	21	15	9000	11000	<b>6009</b>		0,261
	75	16	1	21	15	9000	11000	<b>6009 P5</b>		0,261
	75	16	1	21	15	9000	11000	<b>6009 P4</b>		0,261
	75	16	1	21	15	9000		<b>6009 ZZR</b>		0,261
	75	16	1	21	15	9000		<b>6009 ZZRP4</b>		0,261
	75	16	1	21	15	5600		<b>6009 2RSR</b>		0,261
	75	16	1	21	15	9000	11000	<b>6009 NR</b>	<b>SP75</b>	0,261
	85	19	1,1	32,7	20,6	7500	9000	<b>6209</b>		0,414
	85	19	1,1	32,7	20,6	7500	9000	<b>6209 K</b>		0,414
	85	19	1,1	32,7	20,6	7500	9000	<b>6209 P6</b>		0,414
	85	19	1,1	32,7	20,6	7500	9000	<b>6209 P5</b>		0,414
	85	19	1,1	32,7	20,6	9000		<b>6209 ZZR</b>		0,414
	85	19	1,1	32,7	20,6	8000		<b>6209 ZZRP5</b>		0,414
	85	19	1,1	32,7	20,6	5600		<b>6209 2RSR</b>		0,414
	85	19	1,1	32,7	20,6	5600		<b>6209 2RSRP6</b>		0,414
	85	19	1,1	32,7	20,6	5600		<b>6209 2RSRP5</b>		0,414
	85	19	1,1	32,7	20,6	8000	9500	<b>6209 NR</b>	<b>SP85</b>	0,414
	85	23	1,1	32,7	20,2	8000		<b>62209 2RSR</b>		0,481
	100	25	1,5	52,8	31,7	6700	8000	<b>6309</b>		0,838
	100	25	1,5	52,8	31,7	6700	8000	<b>6309 K</b>		0,838
	100	25	1,5	52,8	31,7	6700	8000	<b>6309 MB</b>		0,838
	100	25	1,5	52,8	31,7	6700	8000	<b>6309 MAP6</b>		0,838
	100	25	1,5	52,8	31,7	6700	8000	<b>6309 P6</b>		0,838
	100	25	1,5	52,8	31,7	6700	8000	<b>6309 P5</b>		0,838
	100	25	1,5	52,8	31,7	6700		<b>6309 ZZR</b>		0,838
	100	25	1,5	52,8	31,7	6700		<b>6309 ZZRP5</b>		0,838
	100	25	1,5	52,8	31,7	4500		<b>6309 2RSR</b>		0,838
	100	25	1,5	52,8	31,7	4500		<b>6309 2RSRP6</b>		0,838
	100	25	1,5	52,8	31,7	4500		<b>6309 2RSRP5</b>		0,838

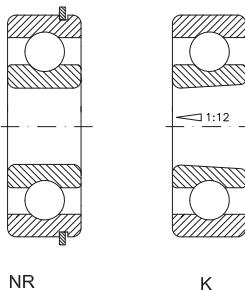
## Single Row Deep Groove Ball Bearings



2RSR                    2ZR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>45</b>	100	25	1,5	52,8	31,7	6700	8000	<b>6309 NR</b>	<b>SP100</b>
	100	36	1,5	52,8	31,7	6700		<b>62309 2RSR</b>	0,838
	120	29	2	76,8	44,9	5600	6700	<b>6409</b>	1,18
	120	29	2	76,8	44,9	5600	6700	<b>6409 NR</b>	1,54
<b>50</b>	65	7	0,3	6,8	6,3	9500	12000	<b>61810</b>	0,057
	65	7	0,3	6,8	6,3	9700	11000	<b>61810 NR</b>	0,057
	72	12	0,6	14,5	10,4	9000	11000	<b>61910</b>	0,130
	72	12	0,6	14,5	10,4	9000	11000	<b>61910 NR</b>	0,130
	80	10	0,6	16,3	13,1	8500	10000	<b>16010</b>	0,188
	80	16	1	21,8	16,6	8500	10000	<b>6010 K</b>	0,260
	80	16	1	21,8	16,6	8500		<b>6010 2ZR</b>	0,260
	80	16	1	21,8	16,6	5300		<b>6010 2RSR</b>	0,260
	90	20	1,1	35,1	23,2	7000	8500	<b>6210</b>	0,460
	90	20	1,1	35,1	23,2	7000	8500	<b>6210 K</b>	0,460
	90	20	1,1	35,1	23,2	7000	8500	<b>6210 M</b>	0,460
	90	20	1,1	35,1	23,2	7000	8500	<b>6210 MAP6</b>	0,460
	90	20	1,1	35,1	23,2	7000	8500	<b>6210 P6</b>	0,460
	90	20	1,1	35,1	23,2	7000	8500	<b>6210 P5</b>	0,460
	90	20	1,1	35,1	23,2	7000		<b>6210 2ZR</b>	0,460
	90	20	1,1	35,1	23,2	7000		<b>6210 2ZRP5</b>	0,460
	90	20	1,1	35,1	23,2	4500		<b>6210 2RSR</b>	0,460
	90	20	1,1	35,1	23,2	4500		<b>6210 2RSRP6</b>	0,460
	90	20	1,1	35,1	23,2	4500		<b>6210 2RSRP5</b>	0,460
	90	20	1,1	35,1	23,2	7000	8500	<b>6210 NR</b>	0,460
	90	23	1,1	35,1	23,2	7000		<b>62210 2RSR</b>	0,514
<b>110</b>	27	2	61,8	37,9	6300	7000	<b>6310</b>	1,06	
	110	27	2	61,8	37,9	6300	7000	<b>6310 K</b>	1,06
	110	27	2	61,8	37,9	6300	7000	<b>6310 MAP6</b>	1,06
	110	27	2	61,8	37,9	6300		<b>6310 2ZR</b>	1,06
	110	27	2	61,8	37,9	4000		<b>6310 2RSR</b>	1,06
	110	27	2	61,8	37,9	6000	7000	<b>6310 NR</b>	1,06
	110	40	2	61,8	37,9	6000		<b>62310 2RSR</b>	1,65
	130	31	2,1	87,1	52	5000	6000	<b>6410</b>	1,89
	130	31	2,1	87,1	52	5000	6000	<b>6410 NR</b>	1,89
								<b>SP10</b>	

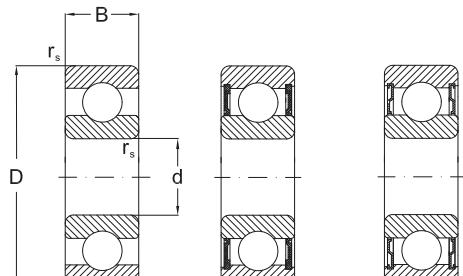
# **Single Row Deep Groove Ball Bearings**



NR K

Dimensions				Basical radial load		Speed limit		Designation		Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	bearing	snap ring	
mm				kN		min <sup>-1</sup>		-		kg
<b>55</b>										
72	9	0,3	9	8,5	8500	10000	<b>61811</b>			0,083
90	11	0,6	19,3	16,3	7500	9000	<b>16011</b>			0,26
90	18	1,1	28,3	21,3	7500	9000	<b>6011 MB</b>			0,39
90	18	1,1	28,3	21,3	7500		<b>6011 2ZR</b>			0,39
90	18	1,1	28,3	21,3	4500		<b>6011 2RSR</b>			0,39
90	18	1,1	28,3	21,3	7500	9000	<b>6011 NR</b>	<b>SP90</b>		0,39
100	21	1,5	43,4	29,4	6300	7500	<b>6211</b>			0,611
100	21	1,5	43,4	29,4	6300	7500	<b>6211 K</b>			0,611
100	21	1,5	43,4	29,4	6300	7500	<b>6211 MA</b>			0,611
100	21	1,5	43,4	29,4	6300		<b>6211 2ZR</b>			0,611
100	21	1,5	43,4	29,4	4000		<b>6211 2RSR</b>			0,611
100	21	1,5	43,4	29,4	6300	7500	<b>6211 NR</b>	<b>SP100</b>		0,611
120	29	2	71,7	45	5300	6300	<b>6311</b>			1,38
120	29	2	71,7	45	5300	6300	<b>6311 K</b>			1,38
120	29	2	71,7	45	5300	6300	<b>6311 MA</b>			1,38
120	29	2	71,7	45	5300		<b>6311 2ZR</b>			1,38
120	29	2	71,7	45	3600		<b>6311 2RSR</b>			1,38
120	29	2	71,7	45	5300	6300	<b>6311 NR</b>	<b>SP120</b>		1,38
140	33	2,1	100	62	4800	5600	<b>6411</b>			2,30
140	33	2,1	100	62	4800	5600	<b>6411 NR</b>	<b>SP140</b>		2,30
<b>60</b>										
78	10	0,3	8,7	6,7	8000	9500	<b>61812</b>			0,120
95	11	0,6	20	17,6	7000	8500	<b>16012</b>			0,280
95	18	1,1	29,4	23,3	6700	8000	<b>6012</b>			0,420
95	18	1,1	29,4	23,3	6700		<b>6012 2ZR</b>			0,420
95	18	1,1	29,4	23,3	4300		<b>6012 2RSR</b>			0,420
95	18	1,1	29,4	23,3	7000	8500	<b>6012 NR</b>	<b>SP95</b>		0,420
110	22	1,5	52,4	36,3	6000	7000	<b>6212</b>			0,780
110	22	1,5	52,4	36,3	6000	7000	<b>6212 K</b>			0,780
110	22	1,5	52,4	36,3	6000	7000	<b>6212 MA</b>			0,780
110	22	1,5	52,4	36,3	6000		<b>6212 2ZR</b>			0,780
110	22	1,5	52,4	36,3	4000		<b>6212 2RSR</b>			0,780
110	22	1,5	52,4	36,3	6000	7000	<b>6212 NR</b>	<b>SP110</b>		0,780
130	31	2,1	81,9	52,2	5000	6000	<b>6312</b>			1,72
130	31	2,1	81,9	52,2	5000	6000	<b>6312 K</b>			1,72
130	31	2,1	81,9	52,2	5000		<b>6312 2ZR</b>			1,72

## Single Row Deep Groove Ball Bearings

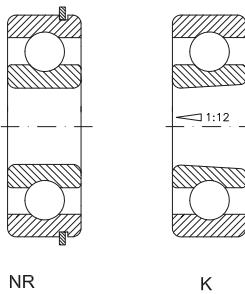


2RSR

2ZR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil	bearing	snap ring
mm				kN		min <sup>-1</sup>		-	
<b>60</b>	130	31	2,1	81,9	52,2	3400		<b>6312 2RSR</b>	1,72
	130	31	2,1	81,9	52,2	5000	6000	<b>6312 NR</b>	<b>SP130</b> 1,72
	150	35	2,1	110	70,8	4300	5000	<b>6412</b>	2,76
	150	35	2,1	110	70,8	4300	5000	<b>6412 NR</b>	<b>SP150</b> 2,76
<b>62</b>	110	22	1,5	47,5	28	6000	7000	<b>62/62</b>	0,600
<b>65</b>	85	10	0,6	12,2	12	7000	8500	<b>61813</b>	0,130
	100	11	0,6	22,9	19,6	6300	7500	<b>16013</b>	0,300
	100	18	1,1	30,5	25,4	6300	7500	<b>6013 K</b>	0,440
	100	18	1,1	30,5	25,4	6300		<b>6013 2ZR</b>	0,440
	100	18	1,1	30,5	25,4	4000		<b>6013 2RSR</b>	0,440
	100	18	1,1	30,5	25,4	6300	7500	<b>6013 NR</b>	<b>SP100</b> 0,440
	120	23	1,5	57,2	40	5300	6300	<b>6213</b>	0,995
	120	23	1,5	57,2	40	5300	6300	<b>6213 M</b>	0,995
	120	23	1,5	57,2	40	5300	6300	<b>6213 MA</b>	0,995
	120	23	1,5	57,2	40	5300		<b>6213 2ZR</b>	0,995
	120	23	1,5	57,2	40	3600		<b>6213 2RSR</b>	0,995
	120	23	1,5	57,2	40	5300	6300	<b>6213 NR</b>	<b>SP120</b> 0,995
	140	33	2,1	92,7	59,7	4800	5600	<b>6313</b>	2,10
	140	33	2,1	92,7	59,7	4800	5600	<b>6313 MA</b>	2,10
	140	33	2,1	92,7	59,7	4800	5600	<b>6313 MB</b>	2,10
	140	33	2,1	92,7	59,7	4800		<b>6313 2ZR</b>	2,10
	140	33	2,1	92,7	59,7	3000		<b>6313 2RSR</b>	2,10
	140	33	2,1	92,7	59,7	4800	5600	<b>6313 NR</b>	<b>SP140</b> 2,10
	160	37	2,1	118	79	4000	4800	<b>6413</b>	3,300
	160	37	2,1	118	79	4000	4800	<b>6413 NR</b>	<b>SP160</b> 3,300
<b>70</b>	90	10	0,6	12,5	10	6700	8000	<b>61814</b>	0,160
	110	13	0,6	27,9	25	6000	7000	<b>16014</b>	0,433
	110	20	1,1	38,1	30,9	6000	7000	<b>6014</b>	0,600
	110	20	1,1	38,1	30,9	6000	7000	<b>6014 MAP5</b>	0,600
	110	20	1,1	38,1	30,9	6000		<b>6014 2ZR</b>	0,600
	110	20	1,1	38,1	30,9	3600		<b>6014 2RSR</b>	0,600
	110	20	1,1	38,1	30,9	6000	7000	<b>6014 NR</b>	<b>SP110</b> 0,600
	125	24	1,5	62,2	44,1	5000	6000	<b>6214</b>	1,07
	125	24	1,5	62,2	44,1	5000	6000	<b>6214 MA</b>	1,07
	125	24	1,5	62,2	44	5000		<b>6214 2ZR</b>	1,07

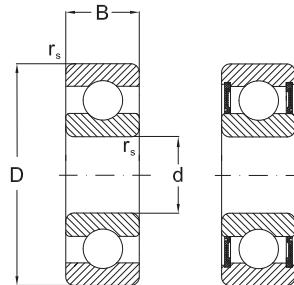
## Single Row Deep Groove Ball Bearings



NR                                    K

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>70</b>	125	24	1,5	62,2	44	3400		<b>6214 2RSR</b>	1,07
	125	24	1,5	62,2	44	5000	6000	<b>6214 NR</b>	<b>SP125</b> 1,07
	150	35	2,1	104	68,1	4500	5300	<b>6314</b>	2,50
	150	35	2,1	104	68,1	4500	5300	<b>6314 K</b>	2,50
	150	35	2,1	104	68,1	4500	5300	<b>6314 MAP6</b>	2,50
	150	35	2,1	104	68,1	4500		<b>6314 2ZR</b>	2,50
	150	35	2,1	104	68,1	2800		<b>6314 2RSR</b>	2,50
	150	35	2,1	104	68,1	4500	5300	<b>6314 NR</b>	<b>SP150</b> 2,50
	180	42	3	144	104	3800	4500	<b>6414</b>	4,85
<b>75</b>	95	10	0,6	12,8	12,1	6300	7500	<b>61815 P5</b>	0,160
	95	10	0,6	12,8	12,1	4000		<b>61815 2RSR</b>	0,160
	115	13	0,6	28,5	26,8	5600	6700	<b>16015</b>	0,460
	115	20	1,1	39,7	33,5	5600	6700	<b>6015 M</b>	0,640
	115	20	1,1	39,7	33,5	5600		<b>6015 MAP5</b>	0,640
	115	20	1,1	39,7	33,5	5600		<b>6015 2ZR</b>	0,640
	115	20	1,1	39,7	33,5	3400		<b>6015 2RSR</b>	0,640
	115	20	1,1	39,7	33,5	5600	6700	<b>6015 NR</b>	<b>SP115</b> 0,640
	130	25	1,5	67,4	49,3	4800	5600	<b>6215</b>	1,18
	130	25	1,5	67,4	49,3	4800	5600	<b>6215 K</b>	1,18
	130	25	1,5	67,4	49,3	4800		<b>6215 2ZR</b>	1,18
	130	25	1,5	67,4	49,3	3200		<b>6215 2RSR</b>	1,18
	130	25	1,5	67,4	49,3	4800	5600	<b>6215 NR</b>	<b>SP130</b> 1,18
	160	37	2,1	113	77	4000	4800	<b>6315</b>	3,03
	160	37	2,1	113	77	4000	4800	<b>6315 MP6</b>	3,03
	160	37	2,1	113	77	4000		<b>6315 2ZR</b>	3,03
	160	37	2,1	113	77	2800		<b>6315 2RSR</b>	3,03
	160	37	2,1	113	77	4000	5000	<b>6315 NR</b>	<b>SP160</b> 3,03
	190	45	3	154	115	3600	4300	<b>6415</b>	6,50
<b>80</b>	100	10	0,6	12,9	13,7	6000	7000	<b>61816</b>	0,160
	110	16	1	25,1	20,5	5600	6700	<b>61916</b>	0,380
	125	14	0,6	31,9	29,7	5300	6300	<b>16016</b>	0,600
	125	22	1,1	47,6	39,8	5300	6300	<b>6016 MA</b>	0,850
	125	22	1,1	47,6	39,8	5300		<b>6016 2ZR</b>	0,850
	125	22	1,1	47,6	39,8	3600		<b>6016 2RSR</b>	0,850
	125	22	1,1	47,6	39,8	5300	6300	<b>6016 NR</b>	<b>SP125</b> 0,850

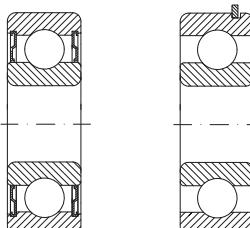
## Single Row Deep Groove Ball Bearings



2RSR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>80</b>	140	26	2	72,7	53	4500	5300	<b>6216</b>	1,40
	140	26	2	72,7	53	4500	5300	<b>6216 K</b>	1,40
	140	26	2	72,7	53	4500	5300	<b>6216 MA</b>	1,40
	140	26	2	72,7	53	4500	5300	<b>6216 2ZR</b>	1,40
	140	26	2	72,7	53	3000	5300	<b>6216 2RSR</b>	1,40
	140	26	2	72,7	53	4500	5300	<b>6216 NR</b>	<b>SP140</b>
	170	39	2,1	123	86,5	3800	4500	<b>6316 K</b>	
	170	39	2,1	123	86,5	3800	4500	<b>6316 M</b>	
	170	39	2,1	123	86,5	3800	5300	<b>6316 2ZR</b>	
	170	39	2,1	123	86,5	3800	4500	<b>6316 NR</b>	
<b>85</b>	200	48	3	164	125	3400	4000	<b>6416</b>	7,50
	110	13	1	19,3	20	5300	6300	<b>61817</b>	0,290
	130	14	1	33,8	33,5	5000	6000	<b>16017</b>	0,630
	130	22	1,1	49,5	43,1	5000	6000	<b>6017</b>	<b>SP130</b>
	130	22	1,1	49,5	43,1	5000	5300	<b>6017 2ZR</b>	
	130	22	1,1	49,5	43,1	3400	5300	<b>6017 2RSR</b>	
	130	22	1,1	49,5	43,1	5000	6000	<b>6017 NR</b>	
	150	28	2	84	61,9	4300	5000	<b>6217</b>	1,80
	150	28	2	84	61,9	4300	5000	<b>6217 K</b>	1,80
	150	28	2	84	61,9	4300	5000	<b>6217 MP6</b>	1,80
<b>90</b>	150	28	2	84	61,9	4300	5000	<b>6217 2ZR</b>	1,80
	150	28	2	84	61,9	2800	5300	<b>6217 2RSR</b>	1,80
	150	28	2	84	61,9	4300	5000	<b>6217 NR</b>	<b>SP150</b>
	180	41	3	133	96,9	3600	4300	<b>6317</b>	4,20
	180	41	3	133	96,9	3600	4300	<b>6317 K</b>	4,20
	180	41	3	133	96,9	3600	4300	<b>6317 MA</b>	
	180	41	3	133	96,9	3600	4300	<b>6317 MB</b>	
	180	41	3	133	96,9	3600	4300	<b>6317 2ZR</b>	
	180	41	3	133	96,9	3600	4300	<b>6317 NR</b>	<b>SP180</b>
	210	52	4	173	136	3200	3800	<b>6417</b>	9,00
<b>90</b>	115	13	1	19,6	20,4	5300	6300	<b>61818</b>	0,300
	140	16	1	41,9	40,4	4500	5300	<b>16018</b>	0,850
	140	24	1,5	58,2	49,7	4500	5300	<b>6018 MA</b>	1,16
	140	24	1,5	58,2	49,7	4500	5300	<b>6018 MP6</b>	1,16
	140	24	1,5	58,2	49,7	4500	5300	<b>6018 2ZR</b>	1,16

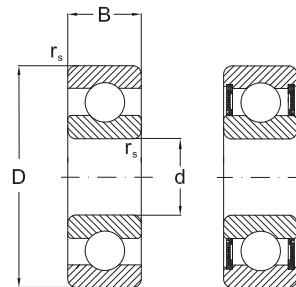
## Single Row Deep Groove Ball Bearings



2ZR                    NR

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>90</b>	140	24	1,5	58,2	49,7	3000		<b>6018 2RSR</b>	
	140	24	1,5	58,2	49,7	4500	5600	<b>6018 NR</b>	<b>SP140</b>
	160	30	2	96	71,5	3800	4500	<b>6218</b>	
	160	30	2	96	71,5	3800	4500	<b>6218 K</b>	
	160	30	2	96	71,5	3800	4500	<b>6218 MA</b>	
	160	30	2	96	71,5	3800	4500	<b>6218 MP6</b>	
	160	30	2	96	71,5	3800		<b>6218 2ZR</b>	
	160	30	2	96	71,5	3800	4500	<b>6218 NR</b>	<b>SP160</b>
	190	43	3	143	107	3400	4000	<b>6318</b>	
	190	43	3	143	107	3400	4000	<b>6318 K</b>	
	190	43	3	143	107	3400	4000	<b>6318 M</b>	
	190	43	3	143	107	3400		<b>6318 2ZR</b>	
	190	43	3	143	107	3400	4000	<b>6318 NR</b>	<b>SP190</b>
	225	54	4	190	160	3000	3600	<b>6418</b>	
	145	16	1	42,3	41,5	4300	5000	<b>16019</b>	
	145	24	1,5	60,5	53,6	4300	5000	<b>6019</b>	
<b>95</b>	145	24	1,5	60,5	53,6	4300		<b>6019 2ZR</b>	
	145	24	1,5	60,5	53,6	2800		<b>6019 2RSR</b>	
	145	24	1,5	60,5	53,6	4300	5000	<b>6019 NR</b>	<b>SP145</b>
	170	32	2,1	109	81,9	3600	4300	<b>6219 MP6</b>	
	170	32	2,1	109	81,9	3600	4300	<b>6219 NR</b>	<b>SP170</b>
	200	45	3	153	118	3200	3800	<b>6319</b>	
	200	45	3	153	118	3200	3800	<b>6319 MAP6</b>	
<b>100</b>	125	13	1	19,6	21,2	4800	5600	<b>61820 MAP5</b>	
	150	16	1	45	44	4300	5000	<b>16020</b>	
	150	24	1,5	60,5	54	4300	5000	<b>6020 MAP6</b>	
	150	24	1,5	60,5	54	4300		<b>6020 2ZR</b>	
	150	24	1,5	60,5	54	2800		<b>6020 2RSR</b>	
	150	24	1,5	60,5	54	4300	5000	<b>6020 NR</b>	<b>SP150</b>
	180	34	2,1	124	93	3400	4000	<b>6220</b>	
	180	34	2,1	124	93	3400	4000	<b>6220 MA</b>	
	180	34	2,1	124	93	3400	4000	<b>6220 MP6</b>	
	180	34	2,1	124	93	3400	4000	<b>6220 NR</b>	<b>SP180</b>
	215	47	3	173	140	3000		<b>6320 2ZR</b>	
	215	47	3	173	140	3000	3600	<b>6320 MAP6</b>	

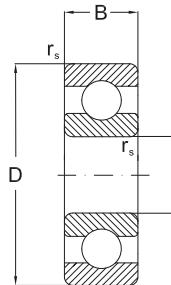
## Single Row Deep Groove Ball Bearings



2RSR

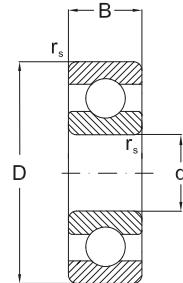
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>105</b>	130	13	1	20,8	19,	4500	5300	<b>61821 MAP5</b>	0,350
	160	18	1	52	51	4000	4800	<b>16021</b>	1,20
	160	26	2	72,3	65,8	3800	4500	<b>6021 M</b>	1,60
	190	36	2,1	133	104	3200	3800	<b>6221</b>	3,70
	190	36	2,1	133	104	3200	3800	<b>6221 MA</b>	3,70
	225	49	3	184	153	2800	3400	<b>6321 MA</b>	8,00
<b>110</b>	140	16	1	28,1	29	4300	5000	<b>61882</b>	0,600
	170	19	1	57,5	56,7	3800	4500	<b>16022</b>	1,46
	170	28	2	82	73	3600	4300	<b>6022</b>	1,95
	200	38	2,1	143	118	3000	3600	<b>6222</b>	4,35
	200	38	2,1	143	118	3000	3600	<b>6222 M</b>	4,35
	200	38	2,1	143	118	3000	3600	<b>6222 NR</b>	<b>SP200</b>
	240	50	3	203	178	2600	3200	<b>6322</b>	
	240	50	3	203	178	2600	3200	<b>6322 MA</b>	9,58
<b>120</b>	150	16	1	29,1	32,5	3800	4500	<b>61824</b>	0,650
	180	19	1	63,2	63,3	3400	4000	<b>16024</b>	1,70
	180	28	2	85	79,3	3400	4000	<b>6024 MP6</b>	2,09
	215	40	2,1	155	131	2800	3400	<b>6224</b>	5,15
	215	40	2,1	155	131	2800	3400	<b>6224 MB</b>	5,15
	215	40	2,1	155	131	2800	3400	<b>6224 MAP6</b>	5,15
	215	40	2,1	155	131	2800	3400	<b>6224 2ZR</b>	5,15
	215	40	2,1	155	131	2800	3400	<b>6224 NR</b>	<b>SP215</b>
	260	55	3	212	190	2400	3000	<b>6324 MA</b>	
<b>130</b>	165	18	1,1	38	43	3600	4300	<b>61826 MAP5</b>	0,930
	200	22	1,1	79	81	3200	3800	<b>16026</b>	2,50
	200	33	2	106	101	3000	3600	<b>6026</b>	3,25
	230	40	3	167	146	2600	3200	<b>6226</b>	6,00
	230	40	3	167	146	2600	3200	<b>6226 M</b>	6,00
	280	58	4	229	214	2200	2800	<b>6326 MA</b>	17,0
<b>140</b>	175	18	1,1	39	46	3400	4000	<b>61828 MAP5</b>	1,00
	210	22	1,1	80,5	86	2800	3400	<b>16028</b>	2,70
	210	33	2	110	109	2800	3400	<b>6028 MP6</b>	3,35
	250	42	3	176	164	2400	3000	<b>6228</b>	7,50
	250	42	3	176	164	2400	3000	<b>6228 MA</b>	7,50
	300	62	4	253	246	2000	2600	<b>6328 MA</b>	21,0

## Single Row Deep Groove Ball Bearings



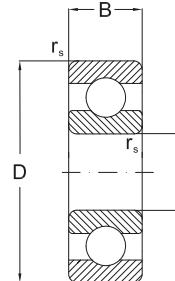
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min	dyn. $C_r$	stat. $C_{0r}$	grease	oil	bearing	snap ring
mm				kN		$\text{min}^{-1}$		-	kg
<b>150</b>	190	20	1,1	48,8	61	3000	3600	<b>61830</b>	1,40
	225	24	1,1	92,3	98	2600	3200	<b>16030</b>	3,40
	225	35	2,1	125	126	2600	3200	<b>6030 MA</b>	4,75
	270	45	3	176	170	2000	2600	<b>6230 MA</b>	9,60
	320	65	4	275	284	1900	2400	<b>6330 MA</b>	25,0
<b>160</b>	200	20	1,1	52	62	2800	3400	<b>61832</b>	1,49
	240	25	1,5	99,4	107	2400	3000	<b>16032</b>	3,60
	240	38	2,1	140	143	2400	3000	<b>6032 MA</b>	5,85
	290	48	3	185	186	1900	2400	<b>6232 MA</b>	15,0
<b>170</b>	215	22	1,1	61,8	73,5	2600	3200	<b>61834 P6</b>	2,00
	260	28	1,5	118	127	2200	2800	<b>16034</b>	5,70
	260	42	2,1	168	172	2200	2800	<b>6034 MA</b>	7,80
	310	52	4	212	224	1900	2400	<b>6234 MA</b>	17,5
<b>180</b>	225	22	1,1	62,3	78,5	2400	3000	<b>61836 P5</b>	2,00
	250	33	2	128	137	2200	2800	<b>61936 MA</b>	4,90
	280	31	2	140	146	2000	2600	<b>16036 MA</b>	7,00
	280	46	2,1	186	194	2000	2600	<b>6036</b>	10,5
	320	52	4	227	242	1800	2200	<b>6236</b>	18,5
<b>190</b>	240	24	1,5	74,1	92	2200	2800	<b>61838</b>	2,60
	290	31	2	148	162	2000	2600	<b>16038</b>	7,90
	290	46	2,1	194	210	2000	2600	<b>6038 MA</b>	11,0
	290	46	2,1	194	210	2000	2600	<b>6038 MB</b>	11,0
	290	46	2,1	194	210	2000	2600	<b>6038 MBP6</b>	11,0
	290	46	2,1	194	210	2000	2600	<b>6038 MBP5</b>	11,0
	340	55	4	255	278	1700	2000	<b>6238 MA</b>	23,0
	340	55	4	255	278	1700	2000	<b>6238 MB</b>	23,0
<b>200</b>	250	24	1,5	78	93	2200	2800	<b>61840 MB</b>	2,70
	280	38	2,1	151	160	2200	2800	<b>61940 MB</b>	7,25
	310	34	2	168	187	1900	2400	<b>16040 MBP6</b>	9,00
	310	34	2	168	187	1900	2400	<b>16040 MBP5</b>	9,00
	310	51	2,1	208	226	1900	2400	<b>6040 MA</b>	13,5
	310	51	2,1	208	226	1900	2400	<b>6040 MB</b>	13,5
	310	51	2,1	208	226	1900	2400	<b>6040 MBP52</b>	13,5
	360	58	4	280	314	1700	2000	<b>6240 M</b>	28,0
	360	58	4	280	314	1700	2000	<b>6240 MB</b>	27,0

## Single Row Deep Groove Ball Bearings



	Dimensions				Basical radial load		Speed limit		Designation	Mass
	d	D	B	r <sub>s</sub> min.	dyn. Cr	stat. C0r	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
	mm				kN					kg
<b>220</b>	270	24	1,5	78	110	1900	2400	<b>61844</b>	3	
	300	38	2,1	151	180	1900	2400	<b>61944</b>	8	
	340	37	2,1	174	204	1800	2200	<b>16044</b>	12	
	340	56	3	245	290	1700	2000	<b>6044</b>	18	
	400	65	4	290	354	1500	1800	<b>6244</b>	36,9	
	460	88	5	410	520	1300	1600	<b>6344</b>	74,5	
<b>240</b>	300	28	2	108	150	1800	2200	<b>61848</b>	4,5	
	320	38	2,1	159	200	1800	2200	<b>61948</b>	8,6	
	360	37	2,1	185	228	1600	1900	<b>16048</b>	14,3	
	360	56	3	255	315	1600	1900	<b>6048</b>	19,9	
	440	72	4	358	475	1400	1700	<b>6248</b>	50,2	
	500	95	5	442	585	1100	1400	<b>6348</b>	96	
<b>260</b>	320	28	2	96	125	1700	2000	<b>61852</b>	4,8	
	360	46	2,1	212	270	1600	1900	<b>61952</b>	14,5	
	400	44	3	238	310	1500	1800	<b>16052</b>	21,2	
	400	65	4	300	390	1400	1700	<b>6052</b>	31,1	
	480	80	5	390	530	1100	1400	<b>6252</b>	66,6	
	540	102	6	507	710	1000	1300	<b>6352</b>	119	
<b>280</b>	350	33	2	125	170	1600	1900	<b>61856</b>	7,4	
	380	46	2,1	216	285	1500	1800	<b>61956</b>	15,5	
	420	44	3	240	325	1400	1700	<b>16056</b>	23,1	
	420	65	4	305	425	1400	1700	<b>6056</b>	33	
	500	80	5	423	600	1100	1400	<b>6256</b>	70,5	
	580	108	6	572	850	950	1200	<b>6356</b>	146	

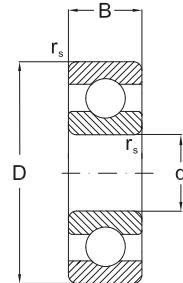
## Single Row Deep Groove Ball Bearings



*Abutment and fillet dimensions see on page 88*

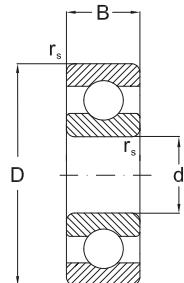
Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	dyn. Cr	stat. COr	grease	oil		
mm				kN		$\text{min}^{-1}$		kg	
<b>300</b>	380	38	2,1	150	195	1400	1700	<b>61860</b>	10,5
	420	56	3	270	375	1300	1600	<b>61960</b>	24,5
	460	50	4	295	415	1300	1600	<b>16060</b>	32,7
	460	74	4	360	510	1200	1500	<b>6060</b>	43,2
<b>320</b>	400	38	2,1	172	255	1300	1600	<b>61864</b>	11
	440	56	3	276	400	1200	1500	<b>61964</b>	25,5
	480	50	4	305	446	1200	1500	<b>16064</b>	34,4
	480	74	4	375	550	1200	1500	<b>6064</b>	49,4
<b>340</b>	420	38	2,1	178	275	1200	1500	<b>61868</b>	11,5
	460	56	3	281	425	1100	1400	<b>61968</b>	26,5
	520	57	4	347	528	1100	1400	<b>16068</b>	47,3
	520	74	5	440	658	1100	1400	<b>6068</b>	61,4
<b>360</b>	440	38	2,1	182	285	1100	1400	<b>61872</b>	12
	480	56	3	291	450	1100	1400	<b>61972</b>	28
	540	57	4	351	550	1000	1300	<b>16072</b>	49,5
	540	82	5	455	735	1000	1300	<b>6072</b>	64,4
<b>380</b>	480	38	2,1	242	390	1000	1300	<b>61876</b>	20
	520	56	4	338	540	1000	1300	<b>61976</b>	40
	560	57	4	377	620	950	1200	<b>16076</b>	50,5
	560	82	5	450	723	1000	1300	<b>6076</b>	67,6
<b>400</b>	500	46	2,1	220	335	1000	1300	<b>61880</b>	20,5
	540	65	4	345	570	950	1200	<b>61980</b>	41,5
	600	90	5	523	857	900	1100	<b>6080</b>	87,2

## Single Row Deep Groove Ball Bearings



Dimensions	d	D	B	Basical radial load		Speed limit		Designation	Mass
				rs min.	Cr dyn.	stat. COr	grease min <sup>-1</sup>		
mm	kN				min <sup>-1</sup>				kg
<b>420</b>	520	46	2,1	224	345	950	1200	<b>61884</b>	21,5
	560	65	4	351	600	900	1100	<b>61984</b>	43
	620	90	5	507	880	900	1100	<b>6084</b>	93
<b>440</b>	540	46	2,1	228	355	900	1100	<b>61888</b>	22,5
	600	74	4	410	720	900	1100	<b>61988</b>	60,5
	650	94	6	553	965	850	1000	<b>6088</b>	105
<b>460</b>	580	56	3	319	570	900	1100	<b>61892</b>	35
	620	74	4	423	750	850	1000	<b>61992</b>	62,5
	680	100	6	580	1056	900	950	<b>6092</b>	121
<b>480</b>	600	56	3	325	600	850	1000	<b>61896</b>	36,5
	650	78	5	449	815	800	950	<b>61996</b>	74
	700	100	6	615	1130	750	900	<b>6096</b>	126
<b>500</b>	620	56	3	332	620	800	950	<b>618/500</b>	37,5
	670	78	5	462	865	750	900	<b>619/500</b>	77
	720	100	6	607	1138	740	890	<b>60/500</b>	135
<b>530</b>	650	56	3	332	655	850	900	<b>618/530</b>	39,5
	710	82	5	488	930	700	850	<b>619/530</b>	90,5
	780	112	6	670	1290	670	800	<b>60/530</b>	186
<b>560</b>	680	56	3	345	695	700	850	<b>618/560</b>	42
	750	85	5	494	980	670	800	<b>619/560</b>	105
	820	115	6	720	1400	630	750	<b>60/560</b>	208
<b>600</b>	730	60	3	364	765	670	800	<b>618/600</b>	52
	800	90	5	585	1220	630	750	<b>619/600</b>	125
	870	118	6	826	1753	670	750	<b>60/600</b>	236

## Single Row Deep Groove Ball Bearings



*Abutment and fillet dimensions see on page 88*

Dimensions				Basical radial load		Speed limit		Designation	Mass
d	D	B	$r_s$ min.	dyn. Cr	stat. COr	grease	oil		
mm				kN		$\text{min}^{-1}$		kg	
<b>630</b>	920	128	7,5	819	1760	560	670	<b>60/630</b>	285
<b>670</b>	820	69	4	442	1000	560	670	<b>618/670</b>	77,5
	900	103	6	676	1500	530	630	<b>619/670</b>	185
	980	136	7,5	904	2040	500	600	<b>60/670</b>	345
<b>750</b>	920	78	5	527	1250	500	600	<b>618/750</b>	110
	1000	112	6	663	1500	500	600	<b>619/750</b>	255



# Single Row Deep Groove Ball Bearing - Stainless Steel Series

## Standards, Boundary dimensions

Standard plans	DIN 616
Deep groove ball bearing	DIN 625

## General

**URB** produce small and medium sized deep groove ball bearing, including thin section bearing in stainless steel.

These bearing have rings and balls made from high - chromium alloy stainless steel.

The cage material for bearings with pressed cages is also stainless steel.

The **URB stainless steel bearings** feature similar load ratings as the standard bearings made from normal bearing steel.

**URB Stainless steel bearings** are resistant to humidity, water, steam and many alkaline solutions.

The resistance to acids, however, is limited. It is dependant upon the individual operating conditions (i.e. acid concentration and its temperature).

In some applications, using sealed stainless steel bearings also the resistance of the lubricant used and the seal material must be considered.

## Design variants

**URB stainless steel deep groove ball bearings** are standard open design.

Sealed (suffixes **RSR** or **.2RSR**) or Shield versions (suffix **ZR** or **.2ZR**) are also produced to order request.

## Tolerances

**URB stainless steel deep groove ball bearings** are produced to normal tolerance class (**PN**) as standard.

The dimensional tolerance values are listed in the chapter "**Bearing tolerances**" on page 26.

## Cages

**URB stainless steel deep groove ball bearings** are fitted with pressed stainless steel cages are standard.

There are several bearing types, cage designs and materials available on request.

## Internal clearance

The **URB range of stainless steel deep groove ball bearings** are produced with **normal internal clearance (CN)** as standard.

Other internal clearance groups may be produced upon request (i.e. **C2** or **C3** etc.).

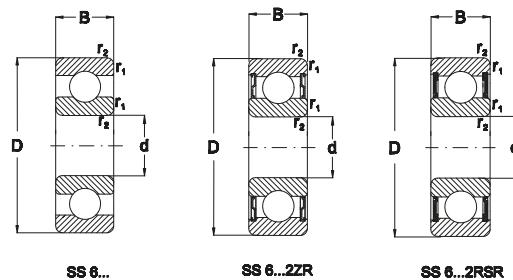
The values of internal clearance groups are as for standard deep groove ball bearings according to DIN 620/part 4 and ISO 5753-1981, respectively.

## Designation

**URB - Stainless Steel Deep groove ball bearing** are identified by a prefix "**SS**" (**SS** stands for "Stainless Steel").

Example: **SS 6205.2RSR**

## Single Row Deep Groove Ball Bearings - Stainless Steel Series



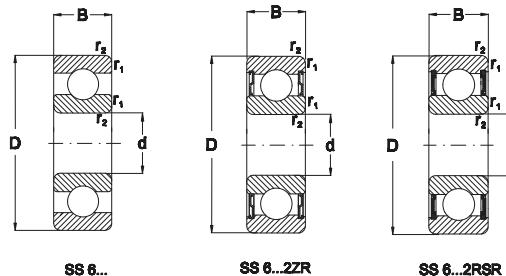
Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
mm				kN					
<b>3</b>	10	4	0,15	0,64	0,32	40000	48000	<b>SS623</b>	0,002
	10	4	0,15	0,64	0,32	40000	-	<b>SS623 2ZR</b>	0,002
<b>4</b>	11	4	0,15	0,96	0,35	48000	56000	<b>SS619/4</b>	0,01
	12	4	0,2	0,8	0,28	52000	62000	<b>SS604</b>	0,002
	13	5	0,2	1,29	0,49	38000	45000	<b>SS624</b>	0,003
	13	5	0,2	1,29	0,49	38000	45000	<b>SS624 ZR</b>	0,003
	13	5	0,2	1,29	0,49	38000	-	<b>SS624 2ZR</b>	0,003
	16	5	0,3	1,46	0,6	36000	43000	<b>SS634</b>	0,006
	16	5	0,3	1,46	0,6	36000	-	<b>SS634 2ZR</b>	0,006
<b>5</b>	13	4	0,2	1,08	0,43	43000	50000	<b>SS619/5</b>	0,02
	16	5	0,3	1,46	0,6	36000	43000	<b>SS625</b>	0,005
	16	5	0,3	1,46	0,6	36000	43000	<b>SS625 ZR</b>	0,005
	16	5	0,3	1,46	0,6	36000	-	<b>SS625 2ZR</b>	0,005
	19	6	0,3	2,45	1,06	32000	38000	<b>SS635</b>	0,009
	19	6	0,3	2,45	1,06	32000	-	<b>SS635 2ZR</b>	0,009
<b>6</b>	17	6	0,3	2,25	0,84	38000	45000	<b>SS619/6</b>	0,04
	19	6	0,3	2,45	1,06	32000	38000	<b>SS626</b>	0,009
	19	6	0,3	2,45	1,06	21500	-	<b>SS626 RSR</b>	0,009
	19	6	0,3	2,45	1,06	21500	-	<b>SS626 2RSR</b>	0,009
	19	6	0,3	2,45	1,06	32000	38000	<b>SS626 ZR</b>	0,009
	19	6	0,3	2,45	1,06	32000	-	<b>SS626 2ZR</b>	0,009
<b>7</b>	17	6	0,3	1,6	0,7	36000	43000	<b>SS619/7</b>	0,05
	19	6	0,3	2,45	1,06	32000	38000	<b>SS607</b>	0,008
	19	6	0,3	2,45	1,06	20000	-	<b>SS607 2RSR</b>	0,008
	19	6	0,3	2,45	1,06	32000	-	<b>SS607 2ZR</b>	0,008
	22	7	0,3	3,25	1,37	30000	36000	<b>SS627</b>	0,013

## Single Row Deep Groove Ball Bearings - Stainless Steel Series

*Abutment and fillet dimensions see on page 88*

Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil		
				kN		min <sup>-1</sup>		kg	
7	22	7	0,3	3,25	1,37	20000	-	<b>SS627 RSR</b>	0,013
	22	7	0,3	3,25	1,37	20000	-	<b>SS627 2RSR</b>	0,013
	22	7	0,3	3,25	1,37	30000	36000	<b>SS627 ZR</b>	0,013
	22	7	0,3	3,25	1,37	30000	-	<b>SS627 2ZR</b>	0,013
8	19	6	0,3	2,24	0,91	36000	43000	<b>SS619/8</b>	0,07
	22	7	0,3	3,25	1,37	30000	36000	<b>SS608</b>	0,013
	22	7	0,3	3,25	1,37	20000	-	<b>SS608 2RSR</b>	0,013
	22	7	0,3	3,25	1,37	30000	-	<b>SS608 2ZR</b>	0,013
9	20	6	0,3	1,72	0,84	34000	40000	<b>SS619/9</b>	0,08
	24	7	0,3	3,65	1,63	30000	36000	<b>SS609</b>	0,015
	24	7	0,3	3,65	1,63	18000	-	<b>SS609 2RSR</b>	0,015
	24	7	0,3	3,65	1,63	30000	-	<b>SS609 2ZR</b>	0,015
	26	8	0,6	4,55	1,96	28000	34000	<b>SS629</b>	0,02
	26	8	0,6	4,55	1,96	18500	-	<b>SS629 RSR</b>	0,02
	26	8	0,6	4,55	1,96	18500	-	<b>SS629 2RSR</b>	0,02
	26	8	0,6	4,55	1,96	28000	34000	<b>SS629 2ZR</b>	0,02
	26	8	0,6	4,55	1,96	28000	-	<b>SS629 2ZB</b>	0,02
10	19	5	0,3	1,73	0,83	34000	40000	<b>SS61800</b>	0,005
	19	5	0,3	1,38	0,59	22000	-	<b>61800/2RSR</b>	0,005
	19	5	0,3	1,38	0,59	34000	-	<b>SS61800 2ZR</b>	0,005
	22	6	0,3	0,95	0,75	34000	40000	<b>SS61900</b>	0,01
	22	6	0,3	0,95	0,75	22000	-	<b>61900 2RSR</b>	0,01
	22	6	0,3	0,95	0,75	34000	-	<b>SS61900 2ZR</b>	0,01
	26	8	0,3	4,5	1,95	28000	34000	<b>SS6000</b>	0,018
	26	8	0,3	4,5	1,95	17000	-	<b>SS6000 2RSR</b>	0,02
	26	8	0,3	4,5	1,95	28000	-	<b>SS6000 2ZB</b>	0,02

## Single Row Deep Groove Ball Bearings - Stainless Steel Series



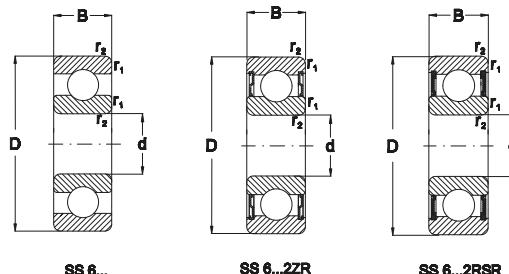
Dimensions	d	D	B	Basic load ratings		Speed ratings		Designation	Mass
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
		mm		kN		min <sup>-1</sup>		kg	
<b>10</b>	30	9	0,6	6	2,6	26000	32000	<b>SS6200</b>	0,03
	30	9	0,6	6	2,6	17000	-	<b>SS6200 2RSR</b>	0,032
	30	9	0,6	6	2,6	26000	-	<b>SS6200 2ZR</b>	0,032
	35	11	0,6	8,2	3,5	22000	28000	<b>SS6300</b>	0,055
	35	11	0,6	8,2	3,5	14500	-	<b>SS6300 2RSR</b>	0,057
	35	11	0,6	8,2	3,5	22000	-	<b>SS6300 2ZR</b>	0,057
<b>12</b>	21	5	0,3	1,4	0,65	32000	37000	<b>SS61801</b>	0,006
	21	5	0,3	1,4	0,65	21000	-	<b>61801 2RSR</b>	0,006
	21	5	0,3	1,4	0,65	32000	-	<b>SS61801 2ZR</b>	0,006
	24	6	0,3	2,3	1,0	30000	36000	<b>SS61901</b>	0,011
	24	6	0,3	2,3	1,0	20000	-	<b>61901 2RSR</b>	0,011
	24	6	0,3	2,3	1,0	30000	-	<b>SS61901 2ZR</b>	0,011
	28	8	0,3	5,1	2,4	26000	32000	<b>SS6001</b>	0,018
	28	8	0,3	5,1	2,4	17000	-	<b>SS6001 2RSR</b>	0,02
	28	8	0,3	5,1	2,4	26000	-	<b>SS6001 2ZR</b>	0,02
	32	10	0,6	6,95	3,1	24000	30000	<b>SS6201</b>	0,037
	32	10	0,6	6,95	3,1	16000	-	<b>SS6201 2RSR</b>	0,04
	32	10	0,6	6,95	3,1	24000	-	<b>SS6201 2ZR</b>	0,04
	37	12	1	9,8	4,2	20000	26000	<b>SS6301</b>	0,06
	37	12	1	9,8	4,2	13000	-	<b>SS6301 2RSR</b>	0,065
	37	12	1	9,8	4,2	20000	-	<b>SS6301 2ZR</b>	0,065
<b>15</b>	24	5	0,3	1,56	0,8	28000	34000	<b>SS61802</b>	0,007
	24	5	0,3	1,56	0,8	18500	-	<b>61802 2RSR</b>	0,007
	24	5	0,3	1,56	0,8	28000	-	<b>SS61802 2ZR</b>	0,007
	28	7	0,3	4,0	2,0	24000	30000	<b>SS61902</b>	0,016
	28	7	0,3	4,0	2,0	16000	-	<b>61902 2RSR</b>	0,016
	28	7	0,3	4,0	2,0	24000	-	<b>SS61902 2ZR</b>	0,016
	32	9	0,3	5,6	2,9	24000	30000	<b>SS6002</b>	0,029

## Single Row Deep Groove Ball Bearings - Stainless Steel Series

*Abutment and fillet dimensions see on page 88*

Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil		
mm				kN				kg	
<b>15</b>	32	9	0,3	5,6	2,9	15000	-	<b>SS6002 2RSR</b>	0,031
	32	9	0,3	5,6	2,9	24000	-	<b>SS6002 2ZR</b>	0,031
	35	11	0,6	7,8	3,8	20000	26000	<b>SS6202</b>	0,043
	35	11	0,6	7,8	3,8	13000	-	<b>SS6202 2RSR</b>	0,046
	35	11	0,6	7,8	3,8	20000	-	<b>SS6202 2ZR</b>	0,046
	42	13	1	11,5	5,5	18000	22000	<b>SS6302</b>	0,09
	42	13	1	11,5	5,5	12000	-	<b>SS6302 2RSR</b>	0,092
	42	13	1	11,5	5,5	18000	-	<b>SS6302 2ZR</b>	0,092
<b>17</b>	26	5	0,3	1,7	0,95	24000	30000	<b>SS61803</b>	0,008
	26	5	0,3	1,7	0,95	16000	-	<b>61803 2RSR</b>	0,008
	26	5	0,3	1,7	0,95	24000	-	<b>SS61803 2ZR</b>	0,008
	28	7	0,3	4,35	2,3	22000	28000	<b>SS61903</b>	0,018
	28	7	0,3	4,35	2,3	14500	-	<b>61903 2RSR</b>	0,018
	28	7	0,3	4,35	2,3	22000	-	<b>SS61903 2ZR</b>	0,018
	35	10	0,3	6	3,25	22000	28000	<b>SS6003</b>	0,037
	35	10	0,3	6	3,25	13000	-	<b>SS6003 2RSR</b>	0,04
	35	10	0,3	6	3,25	22000	-	<b>SS6003 2ZR</b>	0,04
	40	12	0,6	9,6	4,8	18000	22000	<b>SS6203</b>	0,063
	40	12	0,6	9,6	4,8	12000	-	<b>SS6203 2RSR</b>	0,07
	40	12	0,6	9,6	4,8	18000	-	<b>SS6203 2ZR</b>	0,07
	47	14	1	13,7	6,7	16000	19000	<b>SS6303</b>	0,11
	47	14	1	13,7	6,7	10500	-	<b>SS6303 2RSR</b>	0,119
	47	14	1	13,7	6,7	16000	-	<b>SS6303 2ZR</b>	0,119
<b>20</b>	32	7	0,3	2,7	1,5	19000	24000	<b>SS61804</b>	0,018
	32	7	0,3	2,7	1,5	12500	-	<b>61804 2RSR</b>	0,018
	32	7	0,3	2,7	1,5	19000	-	<b>SS61804 2ZR</b>	0,018
	37	9	0,3	6,4	3,7	18000	22000	<b>SS61904</b>	0,018
	37	9	0,3	6,4	3,7	12000	-	<b>61904 2RSR</b>	0,018

## Single Row Deep Groove Ball Bearings - Stainless Steel Series



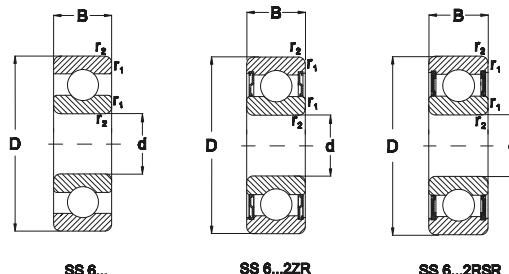
Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil		
mm				kN				kg	
20	37	9	0,3	6,4	3,7	18000	-	<b>SS61904 2ZR</b>	0,018
	42	12	0,6	9,4	5,1	17000	20000	<b>SS6004</b>	0,057
	42	12	0,6	9,4	5,1	11000	-	<b>SS6004 2RSR</b>	0,06
	42	12	0,6	9,4	5,1	17000	-	<b>SS6004 2ZR</b>	0,06
	47	14	1	12,8	6,7	15000	18000	<b>SS6204</b>	0,104
	47	14	1	12,8	6,7	9900	-	<b>SS6204 2RSR</b>	0,105
	47	14	1	12,8	6,7	15000	-	<b>SS6204 2ZR</b>	0,105
	52	15	1,1	17,3	8,5	14000	17000	<b>SS6304</b>	0,148
	52	15	1,1	17,3	8,5	9300	-	<b>SS6304 2RSR</b>	0,158
	52	15	1,1	17,3	8,5	14000	-	<b>SS6304 2ZR</b>	0,158
25	37	7	0,3	4,35	2,6	17000	20000	<b>SS61805</b>	0,022
	37	7	0,3	4,35	2,6	11000	-	<b>SS61805 2RSR</b>	0,022
	37	7	0,3	4,35	2,6	17000	-	<b>SS61805 2ZR</b>	0,022
	42	9	0,3	6,6	4	16000	19000	<b>SS61950</b>	0,045
	42	9	0,3	6,6	4	10500	-	<b>SS61950 2RSR</b>	0,045
	42	9	0,3	6,6	4	16000	-	<b>SS61950 2ZR</b>	0,045
	47	12	0,6	10,1	5,9	16000	19000	<b>SS6005</b>	0,071
	47	12	0,6	10,1	5,9	10500	-	<b>SS6005 2RSR</b>	0,081
	47	12	0,6	10,1	5,9	16000	-	<b>SS6005 2ZR</b>	0,081
	52	15	1	14,3	8	14000	17000	<b>SS6205</b>	0,134
	52	15	1	14,3	8	9300	-	<b>SS6205 2RSR</b>	0,142
	52	15	1	14,3	8	14000	-	<b>SS6205 2ZR</b>	0,142
	62	17	1,1	22,4	11,4	11000	14000	<b>SS6305</b>	0,25
	62	17	1,1	22,4	11,4	7300	-	<b>SS6305 2RSR</b>	0,269
	62	17	1,1	22,4	11,4	11000	-	<b>SS6305 2ZR</b>	0,269
30	42	7	0,3	4,49	2,9	15000	18000	<b>SS61806</b>	0,027
	42	7	0,3	4,49	2,9	10000	-	<b>SS61806 2RSR</b>	0,027
	42	7	0,3	4,49	2,9	15000	-	<b>SS61806 2ZR</b>	0,027

## Single Row Deep Groove Ball Bearings - Stainless Steel Series

*Abutment and fillet dimensions see on page 88*

Dimensions				Basic load ratings		Speed ratings		Designation	Mass
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil		
mm				kN		min <sup>-1</sup>		kg	
<b>30</b>	47	9	0,3	7,25	4,55	14000	17000	<b>SS61906</b>	0,051
	47	9	0,3	7,25	4,55	9500	-	<b>SS61906 2RSR</b>	0,051
	47	9	0,3	7,25	4,55	14000	-	<b>SS61906 2ZR</b>	0,051
	55	13	1	13,2	8,2	13000	16000	<b>SS6006</b>	0,126
	55	13	1	13,2	8,2	8500	-	<b>SS6006 2RSR</b>	0,131
	55	13	1	13,2	8,2	13000	-	<b>SS6006 2ZR</b>	0,131
	62	16	1	19,3	11,2	11000	14000	<b>SS6206</b>	0,193
	62	16	1	19,3	11,2	7300	-	<b>SS6206 2RSR</b>	0,2
	62	16	1	19,3	11,2	11000	-	<b>SS6206 2ZR</b>	0,2
	72	19	1,1	29	16,3	9500	12000	<b>SS6306</b>	0,348
	72	19	1,1	29	16,3	6300	-	<b>SS6306 2RSR</b>	0,369
	72	19	1,1	29	16,3	9500	-	<b>SS6306 2ZR</b>	0,369
<b>35</b>	47	7	0,3	4,75	3,2	13000	16000	<b>SS61807</b>	0,03
	47	7	0,3	4,75	3,2	8500	-	<b>SS61807 2RSR</b>	0,03
	47	7	0,3	4,75	3,2	13000	-	<b>SS61807 2ZR</b>	0,03
	55	10	0,6	9,55	6,2	11000	14000	<b>SS61907</b>	0,08
	55	10	0,6	9,55	6,2	7500	-	<b>SS61907 2RSR</b>	0,08
	55	10	0,6	9,55	6,2	11000	-	<b>SS61907 2ZR</b>	0,08
	62	14	1	16,3	10,4	11000	14000	<b>SS6007</b>	0,14
	62	14	1	16,3	10,4	7300	-	<b>SS6007 2RSR</b>	0,147
	62	14	1	16,3	10,4	11000	-	<b>SS6007 2ZR</b>	0,147
	72	17	1,1	25,7	15,6	9500	12000	<b>SS6207</b>	0,287
	72	17	1,1	25,7	15,6	6300	-	<b>SS6207 2RSR</b>	0,295
	72	17	1,1	25,7	15,6	9500	-	<b>SS6207 2ZR</b>	0,295
<b>40</b>	52	7	0,3	4,9	3,4	11000	14000	<b>SS61808</b>	0,034
	52	7	0,3	4,9	3,4	7000	-	<b>SS61808 2RSR</b>	0,034

## Single Row Deep Groove Ball Bearings - Stainless Steel Series



Dimensions	d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basic load ratings		Speed ratings		Designation	Mass
					dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil		
mm	kN					min <sup>-1</sup>			kg	
<b>40</b>	52	7	0,3	4,9	3,4	11000	-	<b>SS61808 2ZR</b>	0,034	
	62	12	0,6	13,7	9,2	10000	13000	<b>SS61908</b>	0,12	
	62	12	0,6	13,7	9,2	6500	-	<b>SS61908 2RSR</b>	0,12	
	62	12	0,6	13,7	9,2	10000	-	<b>SS61908 2ZR</b>	0,12	
	68	15	1	17	11,8	10000	13000	<b>SS6008</b>	0,182	
	68	15	1	17	11,8	6600	-	<b>SS6008 2RSR</b>	0,19	
	68	15	1	17	11,8	10000	-	<b>SS6008 2ZR</b>	0,19	
	80	18	1,1	32,6	20	8500	10000	<b>SS6208</b>	0,342	
	80	18	1,1	32,6	20	5600	-	<b>SS6208 2RSR</b>	0,353	
	80	18	1,1	32,6	20	8500	-	<b>SS6208 2ZR</b>	0,353	
	90	23	1,5	42,5	25	7500	9000	<b>SS6308</b>	0,641	
	90	23	1,5	42,5	25	5000	-	<b>SS6308 2RSR</b>	0,641	
	90	23	1,5	42,5	25	7500	-	<b>SS6308 2ZR</b>	0,641	
<b>45</b>	58	7	0,3	6,05	4,3	9500	12000	<b>SS61809</b>	0,04	
	58	7	0,3	6,05	4,3	6300	-	<b>SS61809 2RSR</b>	0,04	
	58	7	0,3	6,05	4,3	9500	-	<b>SS61809 2ZR</b>	0,04	
	68	12	0,6	10	6,5	9000	11000	<b>SS61909</b>	0,14	
	68	12	0,6	10	6,5	6000	-	<b>SS61909 2RSR</b>	0,14	
	68	12	0,6	10	6,5	9000	-	<b>SS61909 2ZR</b>	0,14	
	100	25	1,5	53	32	6700	8000	<b>SS6309</b>	0,795	
	100	25	1,5	53	32	4400	-	<b>SS6309 2RSR</b>	0,819	
	100	25	1,5	53	32	6700	-	<b>SS6309 2ZR</b>	0,819	

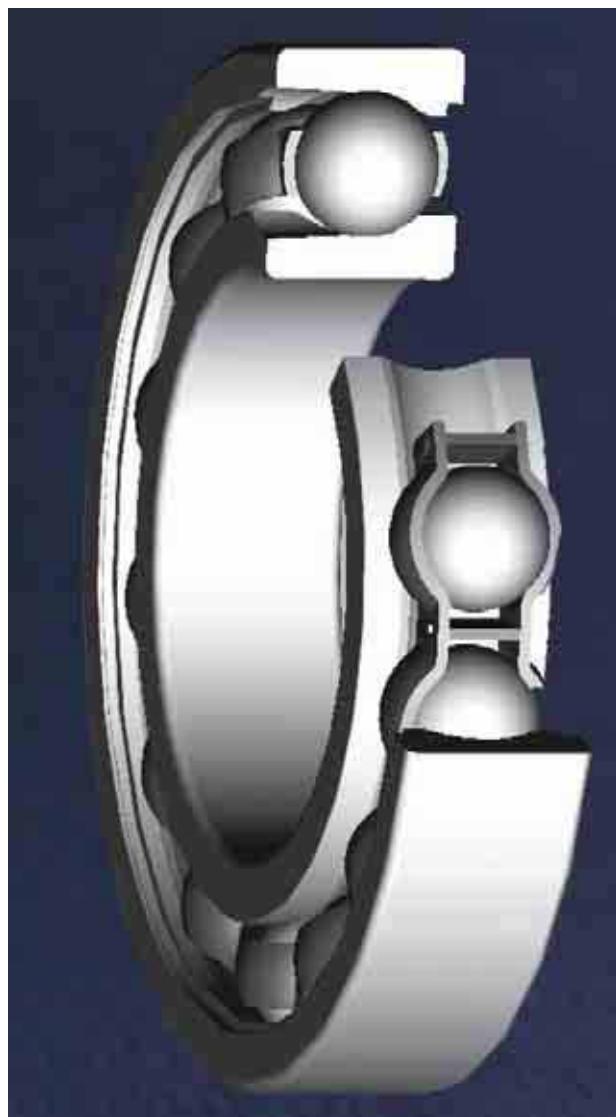
**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

122



# Single Row Deep Groove Ball Bearing - with filling slots

## Designs

A single row deep groove ball bearing with filling slots has a filling slot in both the inner and outer rings (fig. 1) enabling more and larger balls to be incorporated than in standard deep groove ball bearings. Filling slot bearings have a higher radial load carrying capacity than bearings without filling slots, but their axial load carrying capacity is small. They are also unable to operate at such high speeds as bearings without filling slots.

The standard assortment of URB deep groove ball bearings with filling slots comprises

- basic design open bearings
- shielded bearings
- bearings with a snap ring groove.

## Basic design bearings

Basic design bearings with filling slots are open. Those bearings that are also produced in shielded version may have seal recesses in the outer ring, for manufacturing reason (fig. 2).

## Shielded bearings

URB deep groove ball bearings with filling slots are available with shields on one or both sides, designation suffixes ZR or 2ZR. The shield forms a narrow gap to the inner ring shoulder (fig. 3).

Bearings up to and including sizes 217 and 314 are filled with a high-quality NLGI class 2 grease with polyurea thickener, for a temperature range of -30°C to +150°C. The base oil viscosity is 115 mm<sup>2</sup>/s at 40°C and 9,4 mm<sup>2</sup>/s at 100°C.

The quantity of grease fills some 25 to 35% of the free space in the bearing. The bearings are lubricated for life and are maintenance-free. They should therefore not be washed or heated above 80°C before mounting.

## Bearings with a snap ring groove

For easy, space saving axial location of the bearing in the housing, URB deep groove ball bearings with filling slots are available with a snap ring groove in the outer ring, designation suffix N (fig. 4a). The appropriate snap ring is shown in the product table with designation and dimensions and may be supplied separately or already mounted on the bearing, designation suffix NR (fig. 4b). URB deep groove ball bearings with filling slots and a snap ring groove can also be supplied with a shield on the side opposite the snap ring groove (fig. 5a) or with two shields (fig. 5b).

## Bearing data - general

## Dimensions

The boundary dimensions of URB deep groove ball bearings with filling slots are in accordance with ISO 15:1998.

The dimensions of the snap ring groove and snap rings follow ISO 464:1995.

## Tolerances

URB deep groove ball bearings with filling slots are produced to Normal tolerances. The tolerances are in accordance with ISO 492:2002 and can be found in table 3.1/3.2 on page 28.

## Internal clearance

URB single row deep groove ball bearings with filling slots are manufactured with Normal radial internal clearance. The values for radial internal clearance are provided in tab. 1 on pag. 84. They are in accordance with ISO 5753:1991 and are valid for unmounted bearings under zero measuring load.

## Misalignment

The conditions concerning misalignment of the outer ring with respect to the inner ring are the same for deep groove ball bearings. However, the filling slots limit the angular misalignment may lead to the balls running over the edges of the filling slot. This will cause increased bearing noise and reduced bearing service life.

## Cages

URB deep groove ball bearings with filling slots are fitted with a pressed riveted steel cage, ball centred, no designation suffix (fig. 6).

## Minimum load

In order to provide satisfactory operation, deep groove ball bearings with filling slots, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under such conditions, the inertia forces of the balls and cage, and friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the balls and raceways.

The requisite minimum radial load to be applied to deep groove ball bearings with filling slots can be estimated using

$$F_{rm} = k_r \left( \frac{nn}{1000} \right)^{\frac{v}{2}} \left( \frac{d_m}{100} \right)^2$$

where

- $F_{rm}$  = minimum radial load
- $k_r$  = minimum load factor
  - 0,04 for bearings in the 2 series
  - 0,05 for bearings in the 3 series
- $v$  = oil viscosity at operating temperature,  
 $\text{mm}^2/\text{s}$
- $n$  = rotational speed, r/min
- $d_m$  = bearing mean diameter  
 $= 0,5 (d+D)$ , mm

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the deep groove ball bearing must be subjected to an additional radial load.

## Equivalent dynamic bearing load

$$P = F_r + F_a$$

provided  $F_a/F_r \leq 0,6$  and  $P \leq 0,5 C_0$ .

If the axial load  $F_a > 0,6 F_r$  then deep groove ball bearings without filling slots should be used instead.

## Equivalent static bearing load

$$P_0 = F_r + 0,5 F_a$$

provided  $F_a/F_r \leq 0,6$ .

## Supplementary designations

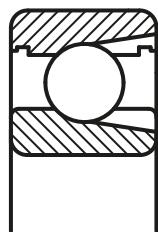
The designation suffixes used to identify certain features of URB deep groove ball bearings with filling slots are explained in the following.

<b>C3</b>	Radial internal clearance greater than Normal
<b>N</b>	Snap ring groove in the outer ring
<b>NR</b>	Snap ring groove in the outer ring, with appropriate snap ring
<b>ZR</b>	Shield of pressed sheet on one side of the bearing
<b>2ZR</b>	ZR shield on both sides of the bearing
<b>ZRNR</b>	Shield of pressed sheet steel on one side of the bearing and snap ring groove in the outer ring with snap ring on the opposite side of the shield
<b>2ZRN</b>	ZR shield on both sides of the bearing and snap ring groove in the outer ring with snap ring

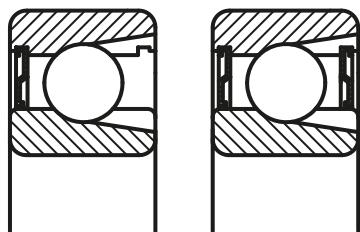
**Fig. 1**



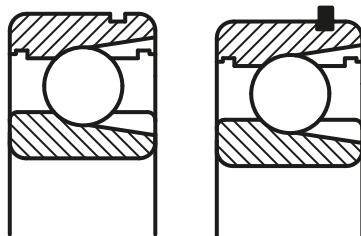
**Fig. 2**



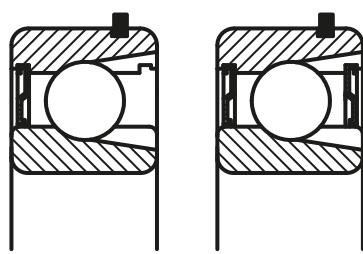
**Fig. 3**



**Fig. 4**



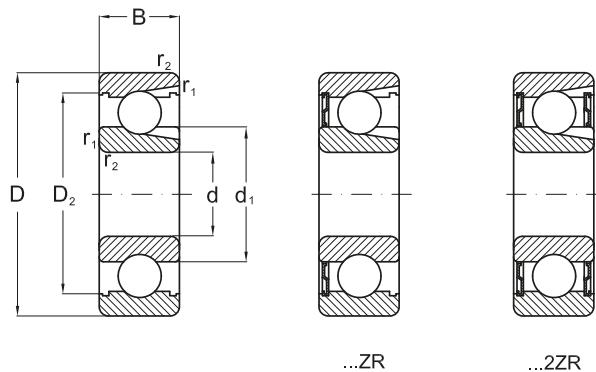
**Fig. 5**



**Fig. 6**



## Single Row Deep Groove Ball Bearings with filling slots d 25-85 mm

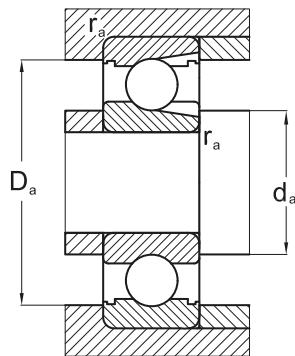


Dimensions			Basical load ratings dynamic static		Fatigue load limit	Speed ratings		Mass
d	D	B	C	C <sub>0</sub>	P <sub>u</sub>	Reference speed	Limiting speed <sup>1)</sup>	kg
mm			kN			min <sup>-1</sup>		
<b>25</b>	62	17	22,9	15,6	0,67	20000	13000	0,24
<b>30</b>	62	16	22,9	17,3	0,735	20000	12000	0,21
	72	19	29,2	20,8	0,88	18000	11000	0,37
<b>35</b>	72	17	29,7	22,8	0,965	17000	11000	0,31
	80	21	39,1	28,5	1,2	16000	10000	0,48
<b>40</b>	80	18	33,6	26,5	1,12	15000	9500	0,39
	90	23	46,8	36	1,53	14000	9000	0,64
<b>45</b>	85	19	39,6	32,5	1,37	14000	9000	0,44
	100	25	59,4	46,5	1,96	13000	8000	0,88
<b>50</b>	90	20	39,1	34,5	1,46	13000	8000	0,5
	110	27	64,4	52	2,2	11000	7000	1,15
<b>55</b>	100	21	48,4	44	1,86	12000	7500	0,66
	120	29	79,2	67	2,85	10000	6700	1,5
<b>60</b>	110	22	56,1	50	2,12	11000	6700	0,85
	130	31	91,3	78	3,35	9500	6000	1,85
<b>65</b>	120	23	60,5	58,5	2,5	10000	6000	1,05
	140	33	102	90	3,75	9000	5600	2,3
<b>70</b>	125	24	66	65,5	2,75	9500	6000	1,15
	150	35	114	102	4,15	8000	5000	2,75
<b>75</b>	130	25	72,1	72	3	9000	5600	1,25
	160	37	125	116	4,55	7500	4800	3,25
<b>80</b>	140	26	88	85	3,45	8500	5300	1,55
	170	39	138	129	4,9	7000	4500	3,95
<b>85</b>	150	28	96,8	100	3,9	7500	4800	1,95
	180	41	147	146	5,3	6700	4300	4,6

<sup>1)</sup> For 2ZR design, limiting speeds are about 80% of the quoted value.

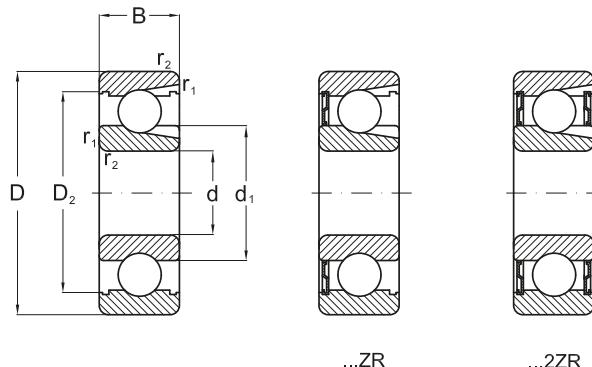
## Single Row Deep Groove Ball Bearings with filling slots

**d 25-85 mm**



Dimensions	Designations						Abutment and fillet dimensions		
	Bearing open		with shields on						
d	d <sub>1</sub>	D <sub>2</sub>	r <sub>1,2</sub> min	one side	two sides	d <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	
mm									
<b>25</b>	32,8	52,7	1,1	<b>305</b>	<b>305 ZR</b>	<b>305 2ZR</b>	31,5	55,5	1
<b>30</b>	36,2	54,1	1	<b>206</b>	<b>206 ZR</b>	<b>206 2ZR</b>	35	57	1
	43,9	61,9	1,1	<b>306</b>	<b>306 ZR</b>	<b>306 2ZR</b>	36,5	65,5	1
<b>35</b>	41,7	62,7	1,1	<b>207</b>	<b>207 ZR</b>	<b>207 2ZR</b>	41,5	65,5	1
	43,7	69,2	1,5	<b>307</b>	<b>307 ZR</b>	<b>307 2ZR</b>	43	72	1,5
<b>40</b>	48,9	69,8	1,1	<b>208</b>	<b>208 ZR</b>	<b>208 2ZR</b>	46,5	73,8	1
	50,5	77,7	1,5	<b>308</b>	<b>308 ZR</b>	<b>308 2ZR</b>	48	82	1,5
<b>45</b>	52,5	75,2	1,1	<b>209</b>	<b>209 ZR</b>	<b>209 2ZR</b>	51,5	78,5	1
	55,9	86,7	1,5	<b>309</b>	<b>309 ZR</b>	<b>309 2ZR</b>	53	92	1,5
<b>50</b>	57,5	81,7	1,1	<b>210</b>	<b>210 ZR</b>	<b>210 2ZR</b>	56,5	83,5	1
	67,5	95,2	2	<b>310</b>	<b>310 ZR</b>	<b>310 2ZR</b>	61	99	2
<b>55</b>	63,1	89,4	1,5	<b>211</b>	<b>211 ZR</b>	<b>211 2ZR</b>	63	92	1,5
	74	104	2	<b>311</b>	<b>311 ZR</b>	<b>311 2ZR</b>	64	111	2
<b>60</b>	70,1	97	1,5	<b>212</b>	<b>212 ZR</b>	<b>212 2ZR</b>	68	102	1,5
	80,3	113	2,1	<b>312</b>	<b>312 ZR</b>	<b>312 2ZR</b>	71	119	2
<b>65</b>	83,3	106	1,5	<b>213</b>	<b>213 ZR</b>	<b>213 2ZR</b>	73	112	1,5
	86,8	122	2,1	<b>313</b>	<b>313 ZR</b>	<b>313 2ZR</b>	76	129	2
<b>70</b>	87,1	111	1,5	<b>214</b>	<b>214 ZR</b>	<b>214 2ZR</b>	78	117	1,5
	93,2	130	2,1	<b>314</b>	<b>314 ZR</b>	<b>314 2ZR</b>	81	139	2
<b>75</b>	92,1	117	1,5	<b>215</b>	<b>215 ZR</b>	<b>215 2ZR</b>	83	122	1,5
	99,7	139	2,1	<b>315</b>	<b>315 ZR</b>	<b>315 2ZR</b>	86	149	2
<b>80</b>	88,8	127	2	<b>216</b>	<b>216 ZR</b>	<b>216 2ZR</b>	89	131	2
	106	147	2,1	<b>316</b>	<b>316 ZR</b>	<b>316 2ZR</b>	91	159	2
<b>85</b>	97	135	2	<b>217</b>	<b>217 ZR</b>	<b>217 2ZR</b>	96	139	2
	113	156	3	<b>317</b>	<b>317 ZR</b>	<b>317 2ZR</b>	98	167	2,5

## Single Row Deep Groove Ball Bearings with filling slots d 90-100 mm

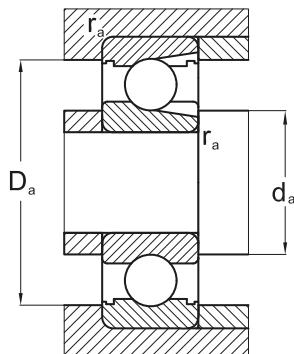


Dimensions			Basical load ratings dynamic static		Fatigue load limit	Speed ratings		Mass
d	D	B	C	$C_0$	$P_u$	Reference speed	Limiting speed <sup>1)</sup>	
mm			kN			$\text{min}^{-1}$		kg
<b>90</b>	160	30	112	114	4,3	7000	4500	2,35
	190	43	157	160	5,7	6300	4000	5,40
<b>95</b>	170	32	121	122	4,5	6700	4300	2,70
<b>100</b>	180	34	134	140	5	6300	4000	3,45

<sup>1)</sup> For 2ZR design, limiting speeds are about 80% of the quoted value.

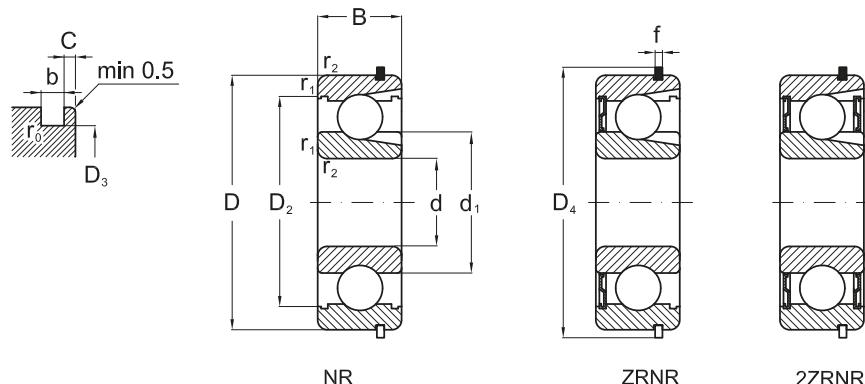
## Single Row Deep Groove Ball Bearings with filling slots

**d 90-100 mm**



Dimensions				Designations			Abutment and fillet dimensions		
d	d <sub>1</sub>	D <sub>2</sub>	r <sub>1,2</sub> min	Bearing open		with shields on			
				one side	two sides	d <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	
mm									
<b>90</b>	110	143	2	<b>218</b>	<b>218 ZR</b>	<b>218 2ZR</b>	99	151	2
	119	164	3	<b>318</b>	<b>318 ZR</b>	<b>318 2ZR</b>	103	177	2,5
<b>95</b>	117	152	2,1	<b>219</b>	<b>219 ZR</b>	<b>219 2ZR</b>	107	158	2
<b>100</b>	123	160	2,1	<b>220</b>	<b>220 Z</b>	<b>220 2ZR</b>	112	168	2

## Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm

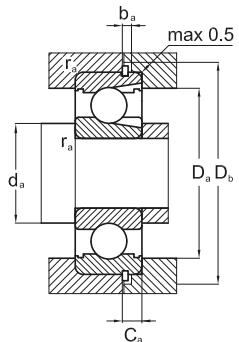


Dimensions		Basical load ratings		Fatigue load limit		Speed ratings		Mass	Designations		Snap ring
d	D	B	C	$C_0$	$P_u$	Reference speed	Limiting speed <sup>1)</sup>	kg	Bearing open	with shields on	
										one side	two sides
mm		kN		min <sup>-1</sup>		kg					
25	62	17	23	16	1	20000	13000	0,24	305 NR	305 ZRNR	305 2ZRN
30	62	16	22,9	17,3	0,735	20000	12000	0,21	206 NR	206 ZRNR	206 2ZRN
	72	19	29,2	20,8	0,88	18000	11000	0,37	306 NR	306 ZRNR	306 2ZRN
35	72	17	29,7	22,8	0,965	17000	11000	0,31	207 NR	207 ZRNR	207 2ZRN
	80	21	39,1	28,5	1,2	16000	10000	0,48	307 NR	307 ZRNR	307 2ZRN
40	80	18	33,6	26,5	1,12	15000	9500	0,39	208 NR	208 ZRNR	208 2ZRN
	90	23	46,8	36	1,53	14000	9000	0,64	308 NR	308 ZRNR	308 2ZRN
45	85	19	39,6	32,5	1,37	14000	9000	0,44	209 NR	209 ZRNR	209 2ZRN
	100	25	59,4	46,5	1,96	13000	8000	0,88	309 NR	309 ZRNR	309 2ZRN
50	90	20	39,1	34,5	1,46	13000	8000	0,50	210 NR	210 ZRNR	210 2ZRN
	110	27	64,4	52	2,2	11000	7000	1,15	310 NR	310 ZRNR	310 2ZRN
55	100	21	48,4	44	1,86	12000	7500	0,66	211 NR	211 ZRNR	211 2ZRN
	120	29	79,2	67	2,85	10000	6700	1,50	311 NR	311 ZRNR	311 2ZRN

<sup>1)</sup> For 2ZR design, limiting speeds are about 80% of the quoted value.

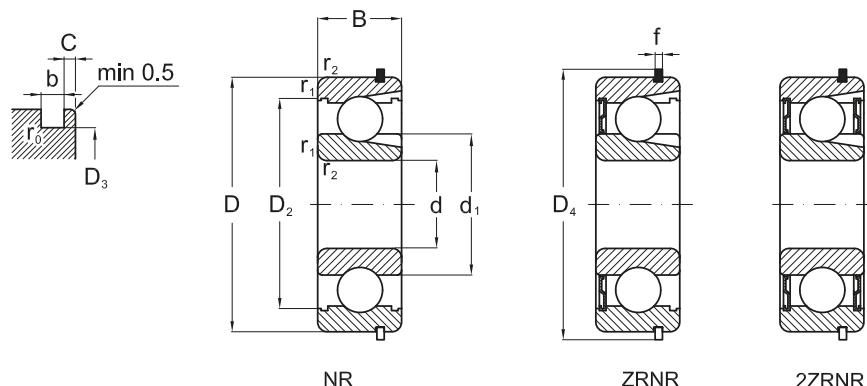
## Single Row Deep Groove Ball Bearings with filling slots and snap rings

**d 25-95 mm**



Dimensions										Abutment and fillet dimensions						
d	d <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	f	b	C	r <sub>0</sub> max	r <sub>1,2</sub> min	d <sub>2</sub> min	D <sub>a</sub> max	D <sub>b</sub> min	b <sub>a</sub> min	C <sub>a</sub> max	r <sub>a</sub> max	
mm										mm						
<b>25</b>	32,8	52,7	59,61	67,7	1,7	1,9	3,28	0,6	1,1	31,5	55,5	69	2,2	4,98	1	
<b>30</b>	36,2	54,1	59,61	67,7	1,7	1,9	3,28	0,6	1	35	57	69	2,2	4,98	1	
	40,1	61,9	68,81	78,6	1,7	1,9	3,28	0,6	1,1	36,5	65,5	80	2,2	4,98	1	
<b>35</b>	41,7	62,7	68,81	78,6	1,7	1,9	3,28	0,6	1,1	41,5	65,5	80	2,2	4,98	1	
	43,7	69,2	76,81	86,6	1,7	1,9	3,28	0,6	1,5	43	72	88	2,2	4,98	1,5	
<b>40</b>	48,9	69,8	76,81	86,6	1,7	1,9	3,28	0,6	1,1	46,5	73,5	88	2,2	4,98	1	
	50,5	77,7	86,79	96,5	2,46	2,7	3,28	0,6	1,5	48	82	98	3	5,74	1,5	
<b>45</b>	52,5	75,2	81,81	91,6	1,7	1,9	3,28	0,6	1,1	51,5	78,5	93	2,2	4,98	1	
	55,9	86,7	96,8	106,5	2,46	2,7	3,28	0,6	1,5	53	92	108	3	5,74	1,5	
<b>50</b>	57,5	81,7	86,79	96,5	2,46	2,7	3,28	0,6	1,1	56,5	83,5	98	3	5,74	1	
	62,5	95,2	106,81	116,6	2,46	2,7	3,28	0,6	2	61	99	118	3	5,74	2	
<b>55</b>	63,1	89,4	96,8	106,5	2,46	2,7	3,28	0,6	1,5	63	92	108	3	5,74	1,5	
	74	104	115,21	129,7	2,82	3,1	4,06	0,6	2	64	111	131	3,5	6,88	2	

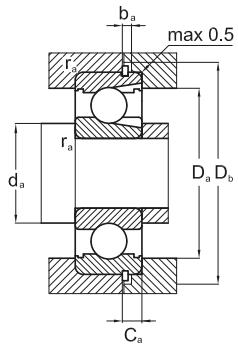
## Single Row Deep Groove Ball Bearings with filling slots and snap rings d 25-95 mm



Dimensions		Basical load ratings				Fatigue load limit		Speed ratings		Mass	Designations		Snap ring
		d	D	B	C	$C_0$	$P_u$	Reference speed	Limiting speed <sup>1)</sup>		Bearing open	with shields on	
		mm				kN				min <sup>-1</sup>	kg		-
<b>60</b>	110	22	56,1	50	2,12	11000	6700	0,85	<b>212 NR</b>	<b>212 ZRNR</b>	<b>212 2ZRN</b>	<b>SP 110</b>	
	130	31	91,3	78	3,35	9500	6000	1,85	<b>312 NR</b>	<b>312 ZRNR</b>	<b>312 2ZRN</b>	<b>SP 130</b>	
<b>65</b>	120	23	60,5	58,5	2,5	10000	6000	1,05	<b>213 NR</b>	<b>213 ZRNR</b>	<b>213 2ZRN</b>	<b>SP 120</b>	
	140	33	102	90	3,75	9000	5600	2,30	<b>313 NR</b>	<b>313 ZRNR</b>	<b>313 2ZRN</b>	<b>SP 140</b>	
<b>70</b>	125	24	66	65,5	2,75	9500	6000	1,15	<b>214 NR</b>	<b>214 ZRNR</b>	<b>214 2ZRN</b>	<b>SP 125</b>	
	150	35	114	102	4,15	8000	5000	2,75	<b>314 NR</b>	<b>314 ZRNR</b>	<b>314 2ZRN</b>	<b>SP 150</b>	
<b>75</b>	130	25	72,1	72	3	9000	5600	1,25	<b>215 NR</b>	<b>215 ZRNR</b>	<b>215 2ZRN</b>	<b>SP 130</b>	
<b>80</b>	140	26	88	85	3,45	8500	5300	1,55	<b>216 NR</b>	<b>216 ZRNR</b>	<b>216 2ZRN</b>	<b>SP 140</b>	
<b>85</b>	150	28	96,8	100	3,9	7500	4800	1,95	<b>217 NR</b>	-	-	<b>SP 150</b>	
<b>90</b>	160	30	112	114	4,3	7000	4500	2,35	<b>218 NR</b>	-	-	<b>SP 160</b>	
<b>95</b>	170	32	121	122	4,5	6700	4300	2,70	<b>219 NR</b>	-	-	<b>SP 170</b>	

## Single Row Deep Groove Ball Bearings with filling slots and snap rings

**d 25-95 mm**



Dimensions	Abutment and fillet dimensions														
	d	d <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	f	b	C	r <sub>0</sub> max	r <sub>1,2</sub> min	d <sub>2</sub> min	D <sub>a</sub> max	D <sub>b</sub> min	b <sub>a</sub> min	C <sub>a</sub> max
mm	mm														
<b>60</b>	70,1	97	106,81	116,6	2,46	2,7	3,28	0,6	1,5	68	102	118	3	5,74	1,5
	80,3	113	125,22	139,7	2,82	3,1	4,06	0,6	2,1	71	119	141	3,5	6,88	2
<b>65</b>	83,3	106	115,21	129,7	2,82	3,1	4,06	0,6	1,5	73	112	131	3,5	6,88	1,5
	86,8	122	135,23	149,7	2,82	3,1	4,9	0,6	2,1	76	129	151	3,5	7,72	2
<b>70</b>	87,1	111	120,22	134,7	2,82	3,1	4,06	0,6	1,5	78	117	136	3,5	6,88	1,5
	87,2	130	145,24	159,7	2,82	3,1	4,9	0,6	2,1	81	139	162	3,5	7,72	2
<b>75</b>	92,1	117	125,22	139,7	2,82	3,1	4,06	0,6	1,5	83	122	141	3,5	6,88	1,5
<b>80</b>	88,8	127	135,23	149,7	2,82	3,1	4,9	0,6	2	89	131	151	3,5	7,72	2
<b>85</b>	97	135	145,24	159,7	2,82	3,1	4,9	0,6	2	96	139	162	3,5	7,72	2
<b>90</b>	110	143	155,22	169,7	2,82	3,1	4,9	0,6	2	99	151	172	3,5	7,72	2
<b>95</b>	117	152	163,65	182,9	3,1	3,5	5,69	0,6	2,1	107	158	185	4	8,79	2



# Double Row Deep Groove Ball Bearing

## Standards, Boundary dimensions

Standard plans	DIN 616
Deep groove ball bearing	DIN 625

## General

Double Row Deep groove ball bearings feature higher load ratings when compared to single row bearings.

This two row bearing gives a very rigid arrangement, but they are very sensitive to misalignments.

## Tolerances

**URB** Double Row Deep groove bearings are produced in normal tolerance class (**PN**) as standard.

## Internal clearance

**URB** Double Row Deep groove ball bearings are produced with **normal internal clearance, (CN)** as standard. Other internal clearance groups may be produced upon request.

## Design variants, Cages

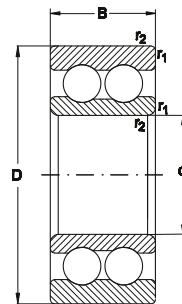
**URB Double Row Deep groove ball bearings** have the latest design (suffix B) without filling slots.

Thus they are able to support thrust loads equally well in both directions. These bearings are fitted with **polyamide cages, (suffix TN)** as standard.

These bearing sizes are also available with **pressed steel cages**.

But, it must be considered that some of these bearings may have filling slots which limit the ability to support thrust loads in the direction of these filling slots.

## Double Row Deep Groove Ball Bearings



Dimensions	d	D	B	Basical load ratings		Speed ratings		Designation	Mass
				dyn. $C_r$	stat. $C_{0r}$	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
mm				kN				kg	
<b>10</b>	30	14	0,6	9,2	5,2	18000	22000	<b>4200 BTN</b>	0,049
<b>12</b>	32	14	0,6	10,6	6,2	17000	20000	<b>4201 BTN</b>	0,053
<b>15</b>	35	14	0,6	11,9	7,5	14000	17000	<b>4202 BTN</b>	0,059
	42	17	1	14,8	9,5	12000	15000	<b>4302 BTN</b>	0,12
<b>17</b>	40	16	0,6	14,8	9,5	12000	15000	<b>4203 BTN</b>	0,090
	47	19	1	19,5	13,5	10000	13000	<b>4303 BTN</b>	0,16
<b>20</b>	47	18	1	17,8	12,5	10000	13000	<b>4204 BTN</b>	0,14
	52	21	1,1	23,4	16	9500	12000	<b>4304 BTN</b>	0,21
<b>25</b>	52	18	1	19	14,5	9000	11000	<b>4205 BTN</b>	0,16
	62	24	1,1	31,9	22,5	8500	10000	<b>4305 BTN</b>	0,34
<b>30</b>	62	20	1	26	20,5	8000	9500	<b>4206 BTN</b>	0,26
	72	27	1,1	41,2	30	7000	8500	<b>4306 BTN</b>	0,50
<b>35</b>	72	23	1,1	35,1	28,5	6700	8000	<b>4207 BTN</b>	0,40
	80	31	1,5	50,5	38	6300	7500	<b>4307 BTN</b>	0,69
<b>40</b>	80	23	1,1	37,05	32,5	6000	7000	<b>4208 BTN</b>	0,50
	90	33	1,5	55,7	45	5600	6700	<b>4308 BTN</b>	0,95

## Double Row Deep Groove Ball Bearings

*Abutment and fillet dimensions see on page 88*

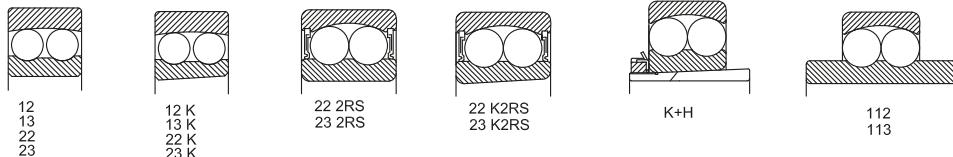
Dimensions				Basical load ratings		Speed ratings		Designation	Mass
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil		
				kN		min <sup>-1</sup>		kg	
<b>45</b>	85	23	1,1	39	36	5600	6700	<b>4209 BTN</b>	0,54
	100	36	1,5	68,5	56	5000	6000	<b>4309 BTN</b>	1,25
<b>50</b>	90	23	1,1	40,5	40	5000	6000	<b>4210 BTN</b>	0,58
	110	40	2	81,5	70	4500	5300	<b>4310 BTN</b>	1,70
<b>55</b>	100	25	1,5	45	44	4800	5600	<b>4211 BTN</b>	0,80
	120	43	2	97,5	83	4300	5000	<b>4311 BTN</b>	2,15
<b>60</b>	110	28	1,5	57	55	4500	5300	<b>4212 BTN</b>	1,10
	130	46	2,1	112	98	3800	4500	<b>4312 BTN</b>	2,65
<b>65</b>	120	31	1,5	67,5	67	4000	4800	<b>4213 BTN</b>	1,45
<b>70</b>	125	31	1,5	70	73,5	3600	4300	<b>4214 BTN</b>	1,50
<b>75</b>	130	31	1,5	72,5	80	3400	4000	<b>4215 BTN</b>	1,60
<b>80</b>	140	33	2	80,5	90	3200	3800	<b>4216 BTN</b>	2,00
<b>85</b>	150	36	2	93,6	102	3000	3600	<b>4217 BTN</b>	2,55
<b>90</b>	160	40	2	112	122	2800	3400	<b>4218 BTN</b>	3,20



# Self-aligning ball bearings

Self-aligning ball bearings have a common spheroid raceway in the outer ring. This feature allows angular misalignment of the shaft relative to the housing. Therefore self-aligning ball bearings are particularly used in case of bearings where misalignment can occur from errors in mounting or from shaft bending.

Double row self-aligning ball bearings are manufactured both with cylindrical bore and tapered bore (taper 1:12). Self-aligning bearings with tapered bore can be delivered, at request, with adapter sleeves.



## Suffixes

- C2** - radial clearance smaller than normal
- C3** - radial clearance larger than normal
- H** - adapter sleeve
- K** - tapered bore bearings
- M** - machined brass cage, ball guided
- MB** - machined brass cage, guided on the inner ring
- P6** - tolerance class more accurate than normal
- P63** - tolerance class P6 with radial clearance C3
- 2RS** - bearing with two seals
- TN** - polyamide cage

## Sealed self-aligning ball bearings

Self aligning ball bearings are also available in a sealed version with seals at both sides. The seals are made of gasoline, oil and wear-resistant synthetic rubber. Sealed bearings are delivered filled with a certain grease quantity. Sealed bearing operating temperatures are between -30°C and +80°C. Grease service life is much

reduced if bearing operates at a temperature higher than +80°C (see page 66).

Sealed bearings are greased for the entire operating period, relubrication not being necessary. Sealed bearings washing or heating before mounting in assembly is not allowed.

## Self-aligning ball bearings with extended inner ring

Self-aligning ball bearings with extended inner ring of series 112 and 113 are used in applications where high accuracy is not necessary and generally, they can be mounted directly on rolled shafts. The bore manufactured to tolerance class J7 allows fast mounting and dismantling. The inner ring has a groove for bearing axial location which can be done by means of a screw or pin.

## Dimensions

Overall dimensions of self-aligning ball bearings are in accordance with ISO 15.

## Misalignment

Self-aligning ball bearings allow within certain limits an angular misalignment of the outer ring in relation to the inner ring, without detrimental effects in bearing unit.

Approximate values for permissible misalignment, under normal operating conditions are given in table 1.

Permissible misalignment		Table 1
Bearing series	Permissible misalignment	
degrees		
108, 126, 127, 129, 135	3	
12, 112	2,5	
13, 113	3	
22	2,5	
22-2 RS	1,5	
23	3	
23-2 RS	1,5	

## Tolerances and radial clearance

Bearings of serial production are manufactured to normal tolerance class and with normal radial clearance. Tapered bore bearings of serial production are also manufactured with radial clearance C3.

Self-aligning ball bearings with extended inner ring are manufactured with radial clearance C2 and normal clearance.

At request, these bearings can also be manufactured to other tolerance classes and with smaller or larger radial clearance.

The bore of self-aligning ball bearings with extended inner ring is manufactured to tolerance class J7.

Bearing tolerances are given on page 28 and the values of radial clearance are given in tables 2 and 3.

Radial clearance of self-aligning ball bearings With cylindrical bore											Table 2	
Bore diameter <b>d</b>	Designation of clearance group											
	C2		Normal Bearing radial clearance		C3		C4		C5			
over mm	up to μm	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
2,5	6	1	8	5	15	10	20	15	25	21	33	
6	10	2	9	6	17	12	25	19	33	27	42	
10	14	2	10	6	19	13	26	21	35	30	48	
14	18	3	12	8	21	15	28	23	37	32	50	
18	24	4	14	10	23	17	30	25	39	34	52	
24	30	5	16	11	24	19	35	29	46	40	58	
30	40	6	18	13	29	23	40	34	53	46	66	
40	50	6	19	14	31	25	44	37	57	50	71	
50	65	7	21	16	36	30	50	45	69	62	88	
65	80	8	24	18	40	35	60	54	83	76	108	
80	100	9	27	22	48	42	70	64	96	89	124	
100	120	10	31	25	56	50	83	75	114	105	145	
120	140	10	38	30	68	60	100	90	135	125	175	
140	160	15	44	35	80	70	120	110	161	150	210	
With tapered bore											Table 3	
18	24	7	17	13	26	20	33	28	42	37	55	
24	30	9	20	15	28	23	39	33	50	44	62	
30	40	12	24	19	35	29	46	40	59	52	72	
40	50	14	27	22	39	33	52	45	65	58	79	
50	65	18	32	27	47	41	61	56	80	73	99	
65	80	23	39	35	57	50	75	69	98	91	123	
80	100	29	47	42	68	62	90	84	116	109	144	
100	120	35	56	50	81	75	108	100	139	130	170	
120	140	40	68	60	98	90	130	120	165	155	205	
140	160	45	74	65	110	100	150	140	191	180	240	

## Equivalent dynamic radial load

$$P_r = F_r + Y_1 F_{a'} \text{ kN, when } F_a/F_r \leq e,$$

$$P_r = 0,65 F_r + Y_2 F_{a'} \text{ kN when } F_a/F_r > e,$$

The values of factors  $e$ ,  $Y_1$  and  $Y_2$  which depend on bearings are given in bearing tables.

## Equivalent static radial load

$$P_{0r} = F_r + Y_0 F_{a'} \text{ kN}$$

The values of the factor  $Y_0$  which depends on bearing are given in bearing tables.

## Axial load on bearings with adapter sleeves

If self-aligning ball bearings are mounted with adapter sleeves on smooth shafts, without side location, their axial carrying capacity depends on the friction between the sleeve bore and shaft.

Permissible axial load can be precisely enough determined using the equation:

$$F_{a\max} = 3 B d,$$

where:

$F_{a\max}$  - maximum permissible axial load, N

$B$  - bearing width, mm

$d$  - bearing bore diameter, mm

## Cages

Self-aligning ball bearings are generally fitted with pressed cages of sheet. At special request, when bearings operate under fluctuating loads, at high speeds and where large sizes are required, machined brass cages are recommended to be used. Glass fibre reinforced polyamide 6.6 cages are also suitable if the operating temperatures do not exceed +120°C. They have low mass, a low coefficient of friction and are noiseless while running.

Cage design and technical data are given in table 4.

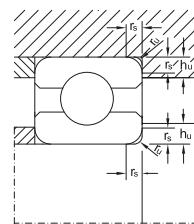
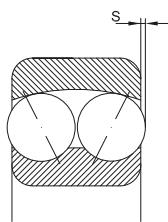
Cage design and technical data

Table 4

Cage	Design bearing	cage	Application	Max. value	
				$D_m$	n
				oil	grease
Pressed sheet cage			- General application - Moderate speeds - Sealed bearings series 12, 13, 22, 23	$600 \times 10^3$	$450 \times 10^3$
Pressed sheet cage			- General application - Moderate speeds - Bearings series 22, 23	$600 \times 10^3$	$450 \times 10^3$
Polyamide cage TN			- High speeds - Bearings series 12, 13, 22, 23	$1000 \times 10^3$	$800 \times 10^3$
Machined brass cage M			- High speeds - Bearings: 1220-1222; 1317-1322; 2217-2222; 2317-2320	$900 \times 10^3$	$700 \times 10^3$

## Special characteristics

In case of some dimensions of self-aligning ball bearings series 12 and 13, the balls protrude somewhat from the bearing, as shown in the adjacent design and table. This should be considered both by designer and user.



**Values of dimension S**

Table 5

Bearing	S
mm	
1224	1,3
1226	0,7
1318	1,0
1319	1,5
1320	2,5
1321	2,6
1322	2,6

## Abutment dimensions

Table 6

$r_s$ min.	$r_u$ max.	$u_{umin}$ min.
Bearing series 12, 13, 112, 22, 23, 113		
mm		
0,3	0,2	1,2
0,6	0,6	2,1
1	1	2,8
1,1	1	3,5
1,5	1,5	4,5
2	2	5,5
2,1	2,1	6

## Abutment dimensions

For a proper location of bearing rings on the shaft shoulder and housing shoulder respectively, maximum connection radius  $r_u$  max. of shaft (housing) should be less than minimum mounting chamfer  $r_s$  min. of bearing.

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

In case of self-aligning ball bearings with tapered bore which are mounted directly on a tapered shaft or with an adapter sleeve, proper tightening and minimum radial clearance of 10-20  $\mu\text{m}$  should be assured for normal clearance and of 20-55  $\mu\text{m}$  for clearance C3, depending on bearing size and series. The values of the connection radius and support shoulder height are given in table 6 and mounting dimensions for bearings mounted with adapter sleeves are given in table 7.

## Self-aligning ball bearings with adapter sleeves

Abutment dimensions

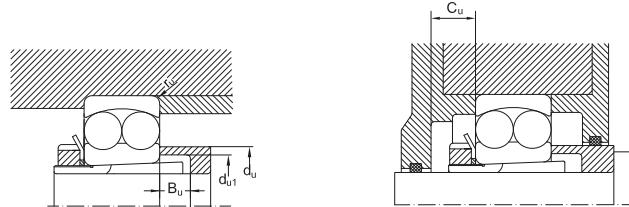
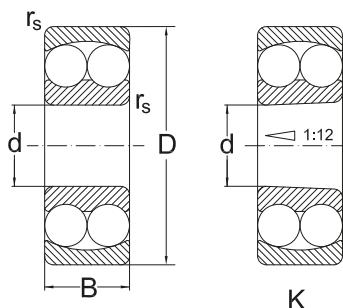


Table 7

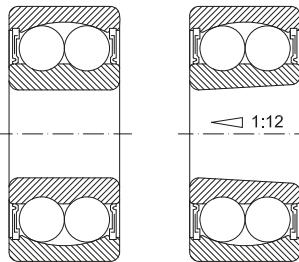
Bore symbol	Shaft diameter	Bearing series												All series
		12K			22K			13K			23K			
		d <sub>u1</sub> min.	d <sub>u</sub> max.	B <sub>u</sub> min.	d <sub>u1</sub> min.	d <sub>u</sub> max.	B <sub>u</sub> min.	d <sub>u1</sub> min.	d <sub>u</sub> max.	B <sub>u</sub> min.	d <sub>u1</sub> min.	d <sub>u</sub> max.	B <sub>u</sub> min.	C <sub>u</sub> min.
mm														
<b>04</b>	<b>17</b>	23	27	5	23	27	5	23	30	8	24	28	5	
<b>05</b>	<b>20</b>	28	32	6	28	32	5	28	35	6	30	34	5	15
<b>06</b>	<b>25</b>	33	38	6	33	38	5	33	42	6	35	40	5	15
<b>07</b>	<b>30</b>	38	45	5	39	44	5	39	49	7	40	45	5	17
<b>08</b>	<b>35</b>	43	52	5	44	50	5	44	55	5	45	51	5	17
<b>09</b>	<b>40</b>	48	57	5	50	56	7	50	61	5	50	57	5	17
<b>10</b>	<b>45</b>	53	62	5	55	61	9	50	61	5	56	63	5	19
<b>11</b>	<b>50</b>	60	69	6	60	68	10	60	74	6	61	69	6	19
<b>12</b>	<b>55</b>	64	75	6	65	73	9	65	83	6	66	74	6	20
<b>13</b>	<b>60</b>	70	83	6	70	79	8	70	89	6	72	82	6	21
<b>14</b>	<b>60</b>	75	86	6	75	85	11	75	94	6	77	88	6	21
<b>15</b>	<b>65</b>	80	92	6	80	90	12	80	100	6	82	94	6	23
<b>16</b>	<b>70</b>	85	99	6	85	96	12	85	107	6	88	100	6	25
<b>17</b>	<b>75</b>	90	105	7	91	102	12	91	114	7	94	106	7	27
<b>18</b>	<b>80</b>	95	110	7	96	108	10	96	120	7	100	112	7	28
<b>19</b>	<b>85</b>	100	117	7	102	114	9	102	126	7	105	117	7	29
<b>20</b>	<b>90</b>	106	124	7	108	120	8	108	132	7	110	125	7	30
<b>21</b>	<b>95</b>	111	131	7										31
<b>22</b>	<b>100</b>	116	138	7										32

## Self-aligning ball bearings



Dimensions				Basical factors radial load				Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>	stat. C <sub>0r</sub>	Y <sub>0</sub>	grease	oil
mm				kN	-			kN	-	min <sup>-1</sup>	-
<b>5</b>	19	6	0,3	2,55	0,33	1,9	3	0,48	2	30000	36000 <b>135</b>
<b>6</b>	19	6	0,3	2,5	0,33	1,9	3	0,48	2	30000	36000 <b>126</b>
<b>7</b>	22	7	0,3	2,65	0,33	1,9	3	0,56	2	30000	36000 <b>127</b>
<b>8</b>	22	7	0,3	2,65	0,33	1,9	3	0,56	2	30000	36000 <b>108</b>
<b>9</b>	26	8	0,6	3,8	0,33	1,9	3	0,8	2	26000	32000 <b>129</b>
<b>10</b>	30	9	0,6	5,5	0,33	1,9	3	1,2	2	24000	30000 <b>1200</b>
	30	14	0,6	7,2	0,54	1,2	1,8	1,6	1,2	22000	28000 <b>2200</b>
	35	11	0,6	7,2	0,34	1,9	2,9	1,6	1,9	20000	26000 <b>1300</b>
<b>12</b>	32	10	0,6	5,6	0,37	1,7	2,6	1,25	1,8	22000	28000 <b>1201</b>
	32	14	0,6	7,6	0,53	1,2	1,8	1,75	1,2	20000	26000 <b>2201</b>
	37	12	1	9,4	0,35	1,8	2,8	2,15	1,9	18000	22000 <b>1301</b>
	37	17	1	9,4	0,54	1,2	1,8	2,3	1,2	17000	20000 <b>2301</b>
<b>15</b>	35	11	0,6	7,5	0,36	1,8	2,7	1,75	1,9	19000	24000 <b>1202</b>
	35	14	0,6	7,7	0,5	1,3	2	1,85	1,3	18000	22000 <b>2202</b>
	42	13	1	9,55	0,35	1,8	2,8	2,3	1,9	17000	20000 <b>1302</b>
	42	17	1	12,1	0,5	1,3	2	2,9	1,3	15000	18000 <b>2302</b>
<b>17</b>	40	12	0,6	7,9	0,32	1,9	3	2,05	2	18000	22000 <b>1203</b>
	40	16	0,6	9,8	0,5	1,3	2	2,4	1,3	17000	20000 <b>2203</b>
	47	14	1	12,5	0,34	1,8	2,9	3,15	2	14000	17000 <b>1303</b>
	47	19	1	14,5	0,49	1,3	2	3,6	1,3	13000	16000 <b>2303</b>
<b>20</b>	47	14	1	9,9	0,28	2,2	3,5	2,65	2,4	15000	18000 <b>1204</b>
	47	14	1	9,9	0,28	2,2	3,5	2,65	2,4	15000	18000 <b>1204 K</b>
	47	18	1	12,6	0,28	2,2	3,5	3,3	2,4	14000	17000 <b>2204</b>
	47	18	1	12,6	0,28	2,2	3,5	3,3	2,4	14000	17000 <b>2204 K</b>
	52	15	1,1	12,4	0,3	2,1	3,3	3,35	2,2	12000	15000 <b>1304</b>
	52	15	1,1	12,4	0,3	2,1	3,3	3,35	2,2	12000	15000 <b>1304 K</b>
	52	21	1,1	18,2	0,52	1,2	1,9	4,7	1,3	11000	14000 <b>2304</b>
	52	21	1,1	18,2	0,52	1,2	1,9	4,7	1,3	11000	14000 <b>2304 K</b>
<b>25</b>	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13000	16000 <b>1205</b>
	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13000	16000 <b>1205 K</b>
	52	15	1	12,2	0,29	2,2	3,4	3,3	2,3	13000	16000 <b>1205 M</b>
	52	18	1	12,5	0,43	1,5	2,3	3,45	1,6	11000	14000 <b>2205</b>
	52	18	1	12,5	0,43	1,5	2,3	3,45	1,6	11000	14000 <b>2205 K</b>
	52	18	1	12,2	0,29	2,2	3,4	3,3	2,3	7000	11000 <b>2205 2RS</b>
	52	18	1	12,2	0,29	2,2	3,4	3,3	2,3	7000	11000 <b>2205 K2RS</b>
	62	17	1,1	17,8	0,28	2,2	3,5	4,9	2,4	9500	12000 <b>1305</b>
	62	17	1,1	17,8	0,28	2,2	3,5	4,9	2,4	9500	12000 <b>1305 K</b>
	62	24	1,1	24,5	0,44	1,4	2,2	6,55	1,5	9500	12000 <b>2305</b>
	62	24	1,1	24,5	0,44	1,4	2,2	6,55	1,5	9500	12000 <b>2305 K</b>
	62	24	1,1	17,8	0,28	2,2	3,5	4,9	2,4	6300	2305 2RS 0,330

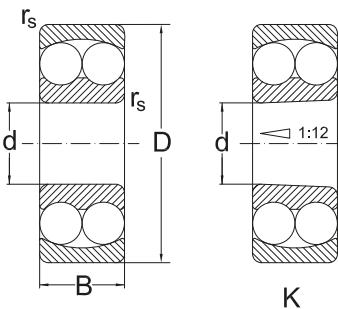
## Self-aligning ball bearings



2RS                    K2RS

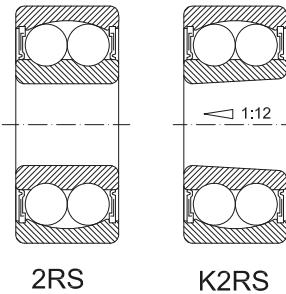
Dimensions				Basical factors				Speed limit		Designation	Mass	
d	D	B	r <sub>s</sub> min.	C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>	C <sub>0r</sub>	Y <sub>0</sub>	grease	oil	
mm				kN	-			kN	-	min <sup>-1</sup>	-	Kg
<b>30</b>	62	16	1	15,7	0,25	2,5	3,9	4,7	2,7	10000	13000	<b>1206</b>
	62	16	1	15,7	0,25	2,5	3,9	4,7	2,7	10000	13000	<b>1206 K</b>
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9500	12000	<b>2206</b>
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9500	12000	<b>2206 K</b>
	62	20	1	15,3	0,4	1,6	2,5	4,6	1,7	9500	12000	<b>2206 M</b>
	62	20	1	15,7	0,25	2,5	3,9	4,7	2,7	5300		<b>2206 2RS</b>
	62	20	1	15,7	0,25	2,5	3,9	4,7	2,7	5300		<b>2206 K2RS</b>
	72	19	1,1	21,4	0,24	2,6	4,1	6,35	2,8	9000	11000	<b>1306</b>
	72	19	1,1	21,4	0,24	2,6	4,1	6,35	2,8	9000	11000	<b>1306 K</b>
	72	27	1,1	31,4	0,4	1,6	2,5	8,7	1,7	8500	10000	<b>2306</b>
	72	27	1,1	31,4	0,4	1,6	2,5	8,7	1,7	8500	10000	<b>2306 K</b>
	72	27	1,1	21,4	0,24	2,6	4,1	6,35	2,8	5600		<b>2306 2RS</b>
<b>35</b>	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9000	11000	<b>1207</b>
	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9000	11000	<b>1207 K</b>
	72	17	1,1	15,8	0,23	2,8	4,2	5,15	2,9	9000	11000	<b>1207 M</b>
	72	23	1,1	21,7	0,37	1,7	2,6	6,7	1,8	8500	10000	<b>2207</b>
	72	23	1,1	21,7	0,37	1,7	2,6	6,7	1,8	8500	10000	<b>2207K</b>
	72	23	1,1	15,8	0,23	2,8	4,2	5,15	2,9	5600		<b>2207 RS</b>
	72	23	1,1	15,8	0,23	2,8	4,2	5,15	2,9	5600		<b>2207 K2RS</b>
	80	21	1,5	25,1	0,25	2,5	3,9	7,95	2,7	7500	9000	<b>1307</b>
	80	21	1,5	25,1	0,25	2,5	3,9	7,95	2,7	7500	9000	<b>1307 K</b>
	80	31	1,5	39,7	0,43	1,5	2,3	12,9	1,6	7000	8500	<b>2307</b>
	80	31	1,5	39,7	0,43	1,5	2,3	12,9	1,6	7000	8500	<b>2307 K</b>
	80	31	1,5	25,1	0,25	2,5	3,9	7,95	2,7	4500		<b>2307 2RS</b>
<b>40</b>	80	18	1,1	19,2	0,22	2,9	4,5	6,5	3	8500	10000	<b>1208</b>
	80	18	1,1	19,2	0,22	2,9	4,5	6,5	3	8500	10000	<b>1208 K</b>
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7500	9000	<b>2208</b>
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7500	9000	<b>2208 K</b>
	80	23	1,1	22,4	0,33	1,9	3	7,4	2	7500	9000	<b>2208 M</b>
	80	23	1,1	19,2	0,22	2,9	4,5	6,5	3	4800		<b>2208 2RS</b>
	80	23	1,1	19,2	0,22	2,9	4,5	6,5	3	4800		<b>2208 K2RS</b>
	90	23	1,5	29,5	0,24	2,6	4,1	9,75	2,8	6700	8000	<b>1308</b>
	90	23	1,5	29,5	0,24	2,6	4,1	9,75	2,8	6700	8000	<b>1308 K</b>
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6300	7500	<b>2308</b>
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6300	7500	<b>2308 K</b>
	90	33	1,5	44,9	0,39	1,6	2,5	15,1	1,7	6300	7500	<b>2308 M</b>
	90	33	1,5	29,5	0,24	2,6	4,1	9,75	2,8	4000		<b>2308 2RS</b>
<b>45</b>	85	19	1,1	21,8	0,21	3	4,7	7,4	3,2	7500	9000	<b>1209</b>
	85	19	1,1	21,8	0,21	3	4,7	7,4	3,2	7500	9000	<b>1209 K</b>
	85	23	1,1	23,3	0,31	2	3,1	8,15	2,1	7000	8500	<b>2209</b>

## Self-aligning ball bearings



Dimensions				Basical factors radial load				Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>	stat. C <sub>0r</sub>	Y <sub>0</sub>	grease	oil
mm				kN				kN		min <sup>-1</sup>	-
											Kg
<b>45</b>				23,3	0,31	2	3,1	8,15	2,1	7000	8500
85	23	1,1		21,8	0,21	3	4,7	7,4	3,2	4500	<b>2209 K</b>
85	23	1,1		21,8	0,21	3	4,7	7,4	3,2	4500	<b>2209 2RS</b>
85	23	1,1		21,8	0,21	3	4,7	7,4	3,2	4500	<b>2209 K2RS</b>
100	25	1,5		37,7	0,24	2,6	4,1	12,9	2,8	6300	<b>1309</b>
100	25	1,5		37,7	0,24	2,6	4,1	12,9	2,8	7500	<b>1309 K</b>
100	36	1,5		54,1	0,31	2	3,1	16,5	2,1	5600	<b>2309</b>
100	36	1,5		54,1	0,31	2	3,1	16,5	2,1	5600	<b>2309 K</b>
100	36	1,5		54,1	0,31	2	3,1	16,5	2,1	6700	<b>2309 2RS</b>
100	36	1,5		37,7	0,24	2,6	4,1	12,9	2,8	3600	
<b>50</b>				22,9	0,21	3	4,7	8,1	3,2	7000	8500
90	20	1,1		22,9	0,21	3	4,7	8,16	3,2	7000	<b>1210</b>
90	20	1,1		22,9	0,21	3	4,7	8,16	3,2	8500	<b>1210 K</b>
90	23	1,1		23,3	0,29	2,2	3,4	8,5	2,3	6300	<b>2210</b>
90	23	1,1		23,3	0,29	2,2	3,4	8,5	2,3	7500	<b>2210 K</b>
90	23	1,1		22,9	0,21	3	4,6	8,1	3,2	4000	<b>2210 2RS</b>
90	23	1,1		22,9	0,21	3	4,6	8,1	3,2	4000	<b>2210 K2RS</b>
110	27	2		43,4	0,24	2,6	4,1	14,2	2,8	5600	<b>1310</b>
110	27	2		43,4	0,24	2,6	4,1	14,2	2,8	5600	<b>1310 K</b>
110	40	2		64,4	0,42	1,5	2,3	20	1,6	5300	<b>2310</b>
110	40	2		64,4	0,42	1,5	2,3	20	1,6	5300	<b>2310 K</b>
110	40	2		43,4	0,24	2,6	4,1	14,2	2,8	3400	<b>2310 2RS</b>
<b>55</b>				26,6	0,2	3,2	4,9	10,1	3,3	6300	7500
100	21	1,5		26,6	0,2	3,2	4,1	10,1	3,3	6300	<b>1211</b>
100	21	1,5		26,6	0,2	3,2	4,1	10,1	3,3	7500	<b>1211 K</b>
100	25	1,5		26,5	0,27	2,3	3,6	9,9	2,5	6000	<b>2211</b>
100	25	1,5		26,5	0,27	2,3	3,6	9,9	2,5	7000	<b>2211 K</b>
120	29	2		51,3	0,23	2,3	4,2	18,1	2,9	5000	<b>1311</b>
120	29	2		51,3	0,23	2,8	4,2	18,1	2,9	5000	<b>1311 K</b>
120	43	2		75,3	0,41	1,5	2,4	23,8	1,6	4800	<b>2311</b>
120	43	2		75,3	0,41	1,5	2,4	23,8	1,6	4800	<b>2311 K</b>
<b>60</b>				30,2	0,19	3,4	5,2	11,6	3,5	5600	6700
110	22	1,5		30,2	0,19	3,4	5,2	11,6	3,5	5600	<b>1212</b>
110	22	1,5		30,2	0,19	3,4	5,2	11,6	3,5	6700	<b>1212 K</b>
110	28	1,5		33,8	0,28	2,2	3,5	12,6	2,4	5300	<b>2212</b>
110	28	1,5		33,8	0,28	2,2	3,5	12,6	2,4	6300	<b>2212 K</b>
130	31	2,1		57,1	0,23	2,8	4,2	20,8	2,9	4500	<b>1312</b>
130	31	2,1		57,1	0,23	2,8	4,2	20,8	2,9	4500	<b>1312 K</b>
130	46	2,1		87,1	0,41	1,5	2,4	28	1,6	4300	<b>2312</b>
130	46	2,1		87,1	0,41	1,5	2,4	28	1,6	4300	<b>2312 K</b>
<b>65</b>				31	0,17	3,7	5,7	12,4	3,9	5300	6300
120	23	1,5		31	0,17	3,7	5,7	12,4	3,9	5300	<b>1213</b>
120	23	1,5		31	0,17	3,7	5,7	12,4	3,9	6300	<b>1213 K</b>
120	31	1,5		43,6	0,28	2,2	3,5	16,4	2,4	5000	<b>2213</b>
120	31	1,5		43,6	0,28	2,2	3,5	16,4	2,4	6000	<b>2213 K</b>
140	33	2,1		62	0,23	2,8	4,2	22,9	2,8	4300	<b>1313</b>

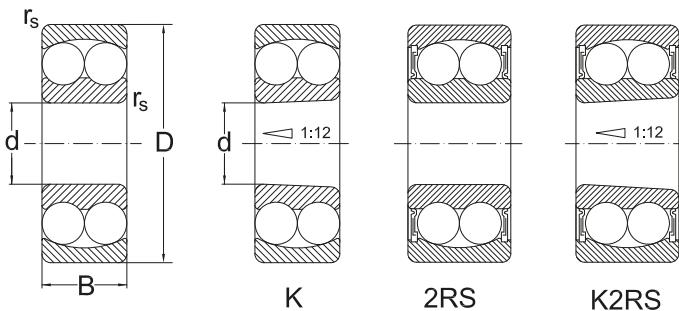
## Self-aligning ball bearings



2RS                    K2RS

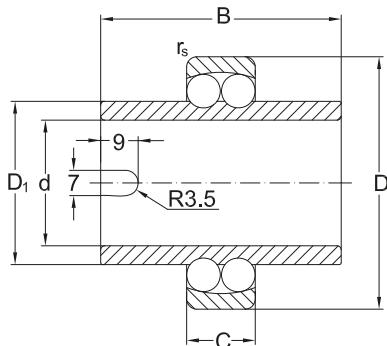
Dimensions				Basical factors radial load				Speed limit		Designation	Mass	
d	D	B	r <sub>s</sub> min.	C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>	C <sub>0r</sub>	Y <sub>0</sub>	grease	oil	
mm				kN	-			kN	-	min <sup>-1</sup>	-	Kg
<b>65</b>	140	33	2,1	62	0,23	2,8	4,2	22,9	2,8	4300	5000	<b>1313 K</b>
	140	48	2,1	95,6	0,38	1,7	2,6	32,5	1,7	4000	4800	<b>2313</b>
	140	48	2,1	95,6	0,38	1,7	2,6	32,5	1,7	4000	4800	<b>2313 K</b>
<b>70</b>	125	24	1,5	34,6	0,18	3,5	5,4	13,7	3,7	5000	6000	<b>1214</b>
	125	24	1,5	34,6	0,18	3,5	5,4	13,7	3,7	5000	6000	<b>1214 K</b>
	125	31	1,5	44,2	0,27	2,3	3,6	17,1	2,5	4800	5600	<b>2214</b>
	125	31	1,5	44,2	0,27	2,3	3,6	17,1	2,5	4800	5600	<b>2214 K</b>
	150	35	2,1	74,1	0,22	2,9	4,5	27,7	3	4000	4800	<b>1314</b>
	150	35	2,1	74,1	0,22	2,9	4,5	27,7	3	4000	4800	<b>1314 K</b>
	150	51	2,1	111	0,35	1,8	2,8	31,7	1,9	3600	4300	<b>2314</b>
	150	51	2,1	111	0,35	1,8	2,8	31,7	1,9	3600	4300	<b>2314 K</b>
<b>75</b>	130	25	1,5	38,9	0,18	3,5	5,4	15,6	3,7	4800	5600	<b>1215</b>
	130	25	1,5	38,9	0,18	3,5	5,4	15,6	3,7	4800	5600	<b>1215 K</b>
	130	31	1,5	44	0,25	2,5	3,9	17,8	2,7	4500	5300	<b>2215</b>
	130	31	1,5	44	0,25	2,5	3,9	17,8	2,7	4500	5300	<b>2215 K</b>
	160	37	2,1	79,2	0,22	2,9	4,5	30	3	3600	4300	<b>1315</b>
	160	37	2,1	79,2	0,22	2,9	4,5	30	3	3600	4300	<b>1315 K</b>
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3400	4000	<b>2315</b>
	160	55	2,1	123	0,38	1,7	2,6	42,8	1,7	3400	4000	<b>2315 K</b>
<b>80</b>	140	26	2	39,8	0,16	3,9	6,1	17	4,1	4300	5000	<b>1216</b>
	140	26	2	39,8	0,16	3,9	6,1	17	4,1	4300	5000	<b>1216 K</b>
	140	33	2	48,8	0,26	2,4	3,7	19,9	2,5	4000	4800	<b>2216</b>
	140	33	2	48,8	0,26	2,4	3,7	19,9	2,5	4000	4800	<b>2216 K</b>
	170	39	2,1	88,4	0,22	2,9	4,5	33	3	3400	4000	<b>1316</b>
	170	39	2,1	88,4	0,22	2,9	4,5	33	3	3400	4000	<b>1316 K</b>
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3200	3800	<b>2316</b>
	170	58	2,1	136	0,34	1,9	2,9	48,5	2	3200	3800	<b>2316 K</b>
<b>85</b>	150	28	2	48,2	0,17	3,7	5,7	20,8	3,9	4000	4800	<b>1217</b>
	150	28	2	48,2	0,17	3,7	5,7	20,8	3,9	4000	4800	<b>1217 K</b>
	150	36	2	58,5	0,25	2,5	3,9	23,8	2,7	3800	4800	<b>2217</b>
	150	36	2	58,5	0,25	2,5	3,9	23,8	2,7	3800	4500	<b>2217 K</b>
	180	41	3	97,5	0,22	2,9	4,5	37,9	3	3200	4800	<b>1317</b>
	180	41	3	97,5	0,22	2,9	4,5	37,9	3	3200	3800	<b>1317 K</b>
	180	60	3	140	0,37	1,7	2,6	51,5	1,8	3000	3600	<b>2317</b>
	180	60	3	140	0,37	1,7	2,6	51,5	1,8	3000	3600	<b>2317 K</b>
<b>90</b>	160	30	2	57	0,17	3,7	5,7	23,1	3,9	3800	4500	<b>1218</b>
	160	30	2	57	0,17	3,7	5,7	23,1	3,9	3800	4500	<b>1218 K</b>
	160	40	2	70,2	0,27	2,3	3,6	27,2	2,5	3600	4300	<b>2218</b>

## Self-aligning ball bearings



Dimensions				Basical factors				Speed limit		Designation	Mass	
d	D	B	r <sub>s</sub> min.	C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>	C <sub>0r</sub>	Y <sub>0</sub>	grease	oil	
mm				kN	-			kN	-	min <sup>-1</sup>	-	Kg
<b>90</b>	160	40	2	70,2	0,27	2,3	3,6	27,2	2,5	3600	4300	<b>2218 K</b>
	190	43	3	117	0,22	2,9	4,5	44,5	3	3000	3600	<b>1318</b>
	190	43	3	117	0,22	2,9	4,5	44,5	3	3000	3600	<b>1318 K</b>
	190	64	3	153	0,38	1,7	2,6	57,7	1,7	2800	3400	<b>2318</b>
	190	64	3	153	0,38	1,7	2,6	57,7	1,7	2800	3400	<b>2318 K</b>
<b>95</b>	170	32	2,1	63,7	0,17	3,7	5,7	24,3	3,9	3400	4000	<b>1219</b>
	170	32	2,1	63,7	0,17	3,7	5,7	24,3	3,9	3400	4000	<b>1219 K</b>
	200	45	3	133	0,23	2,8	4,2	50,8	2,9	2800	3400	<b>1319</b>
	200	45	3	133	0,23	2,8	4,2	50,8	2,9	2800	3400	<b>1319 K</b>
<b>100</b>	180	34	2,1	68,9	0,17	3,7	5,7	29,7	3,9	3200	3800	<b>1220</b>
	180	34	2,1	68,9	0,17	3,7	5,7	29,7	3,9	3200	3800	<b>1220 K</b>
	180	46	2,1	97,5	0,24	2,6	4,1	34	2,8	3200	3800	<b>2220</b>
	180	46	2,1	97,5	0,24	2,6	4,1	34	2,8	3200	3800	<b>2220 K</b>
	215	47	3	143	0,24	2,6	4,1	57,3	2,8	2600	3200	<b>1320</b>
	215	47	3	143	0,24	2,6	4,1	57,3	2,8	2600	3200	<b>1320 K</b>
	215	73	3	193	0,34	1,9	2,9	73,4	2	2400	3000	<b>2320</b>
<b>110</b>	200	38	2,1	88	0,17	3,7	5,7	35,2	3,9	2800	3400	<b>1222</b>
	200	38	2,1	88	0,17	3,7	5,7	35,2	3,9	2800	3400	<b>1222 K</b>
	200	53	2,1	124	0,26	2,4	3,7	48,9	2,5	2800	3400	<b>2222</b>
	200	53	2,1	124	0,26	2,4	3,7	48,9	2,5	2800	3400	<b>2222 K</b>
	240	50	3	163	0,22	2,9	4,5	67,5	3	2400	3000	<b>1322</b>
	240	50	3	163	0,22	2,9	4,5	67,5	3	2400	3000	<b>1322 K</b>

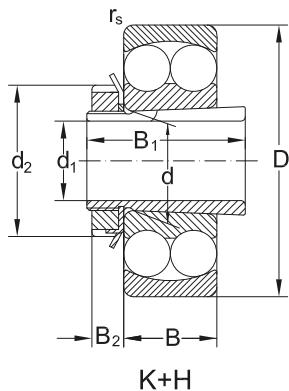
## Self-aligning ball bearings with extended inner ring



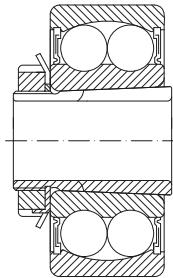
d <sup>1)</sup> mm	D mm	C mm	B mm	D <sub>1</sub> mm	r <sub>s</sub> min. mm	Basical Factors			Speed limit			Designation	Mass kg		
						radial load			stat.						
						C <sub>r</sub> dyn.	e	Y <sub>1</sub>	Y <sub>2</sub>	C <sub>0r</sub>	Y <sub>0</sub>				
<b>20</b>	47	14	40	29,2	1	9,9	0,28	2,2	3,5	2,65	2,4	7100	9000 <b>11204</b>	0,180	
	52	15	44	31,5	1,1	12,4	0,3	2,1	3,3	3,35	2,2	8000	6300 <b>11304</b>	0,270	
<b>25</b>	52	15	44	33,3	1	12,2	0,29	2,2	3,4	3,3	2,3	6300	8000 <b>11205</b>	0,220	
	62	17	48	38	1,1	17,8	0,28	2,2	3,5	4,9	2,4	5000	6300 <b>11305</b>	0,410	
<b>30</b>	62	16	48	40,1	1	15,7	0,25	2,5	3,9	4,7	2,7	5000	6300 <b>11206</b>	0,350	
	72	19	52	45	1,1	21,4	0,24	2,6	4,1	6,35	2,8	4000	5000 <b>11306</b>	0,610	
<b>35</b>	72	17	52	47,7	1,1	15,8	0,23	2,8	4,2	5,15	2,9	4000	5000 <b>11207</b>	0,540	
	80	21	56	51,7	1,5	25,1	0,25	2,5	3,9	7,95	2,7	3600	4500 <b>11307</b>	0,810	
<b>40</b>	80	18	56	54	1,1	19,2	0,22	2,9	4,5	6,5	3	3600	4500 <b>11208</b>	0,720	
	90	23	58	57,7	1,5	29,5	0,24	2,6	4,1	9,75	2,8	3200	4000 <b>11308</b>	1,08	
<b>45</b>	85	19	58	57,7	1,1	21,8	0,21	3	4,7	7,4	3,2	3600	4500 <b>11209</b>	0,770	
	100	25	60	63,9	1,5	37,7	0,24	2,6	4,1	12,8	2,8	2800	3600 <b>11309</b>	1,38	
<b>50</b>	90	20	58	62,7	1,1	22,9	0,21	3	4,7	8,1	3,2	3200	4000 <b>11210</b>	0,850	
	110	27	62	70,3	2	43,4	0,24	2,6	4,1	14,1	2,8	2500	3200 <b>11310</b>	1,72	
<b>55</b>	100	21	60	69,5	1,5	26,6	0,2	3,2	4,9	10,0	3,3	2800	3600 <b>11211</b>	1,13	
<b>60</b>	110	22	62	78	1,5	30,2	0,19	3,4	5,2	11,6	3,5	2500	3200 <b>11212</b>	1,50	

1) Tolerance J7

## Self-aligning ball bearings with adapter sleeve



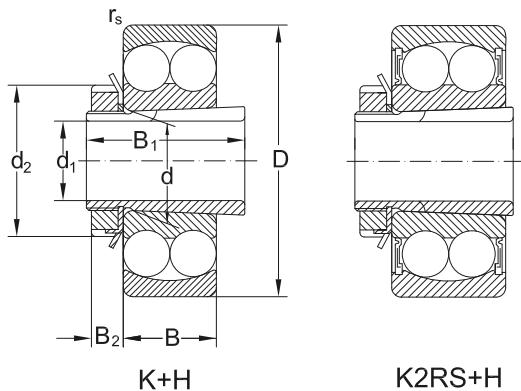
Dimensions								Designation		Mass
d <sub>1</sub>	d	D	B	r <sub>s</sub> min.	d <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>	bearing	adapter sleeve	
mm								Kg		
<b>17</b>	20	47	14	1	32	24	7	<b>1204 K</b>	<b>H204</b>	0,167
	20	47	18	1	32	28	7	<b>2204 K</b>	<b>H304</b>	0,201
	20	52	15	1,1	32	28	7	<b>1304 K</b>	<b>H304</b>	0,221
	20	52	21	1,1	32	31	7	<b>2304 K</b>	<b>H2304</b>	0,281
<b>20</b>	25	52	15	1	38	26	8	<b>1205 K</b>	<b>H205</b>	0,219
	25	52	18	1	38	29	8	<b>2205 K</b>	<b>H305</b>	0,233
	25	52	18	1	38	29	8	<b>2205 K2RS</b>	<b>H305</b>	0,236
	25	62	17	1,1	38	29	8	<b>1305 K</b>	<b>H305</b>	0,227
<b>25</b>	25	62	24	1,1	38	35	8	<b>2305 K</b>	<b>H2305</b>	0,414
	30	62	16	1	45	27	8	<b>1206 K</b>	<b>H206</b>	0,33
	30	62	20	1	45	31	8	<b>2206 K</b>	<b>H306</b>	0,363
	30	62	20	1	45	31	8	<b>2206 K2RS</b>	<b>H306</b>	0,363
<b>30</b>	30	72	19	1,1	45	31	8	<b>1306 K</b>	<b>H306</b>	0,49
	30	72	27	1,1	45	38	8	<b>2306 K</b>	<b>H2306</b>	0,615
	35	72	17	1,1	52	29	9	<b>1207 K</b>	<b>H207</b>	0,422
	35	72	23	1,1	52	35	9	<b>2207 K</b>	<b>H307</b>	0,538
<b>35</b>	35	72	23	1,1	52	35	9	<b>2207 K2RS</b>	<b>H307</b>	0,538
	35	80	21	1,5	52	35	9	<b>1307 K</b>	<b>H307</b>	0,644
	35	80	31	1,5	52	43	9	<b>2307 K</b>	<b>H2307</b>	0,822
	40	80	18	1,1	58	31	10	<b>1208 K</b>	<b>H208</b>	0,585
<b>35</b>	40	80	23	1,1	58	36	10	<b>2208 K</b>	<b>H308</b>	0,683
	40	80	23	1,1	58	36	10	<b>2208 K2RS</b>	<b>H308</b>	0,683
	40	90	23	1,1	58	36	10	<b>1308 K</b>	<b>H308</b>	0,893
	40	90	33	1,5	58	46	10	<b>2308 K</b>	<b>H2308</b>	1,13
<b>40</b>	45	85	19	1,1	65	33	11	<b>1209 K</b>	<b>H209</b>	0,686
	45	85	23	1,1	65	39	11	<b>2209 K</b>	<b>H309</b>	0,781
	45	85	23	1,1	65	39	11	<b>2209 K2RS</b>	<b>H309</b>	0,781
	45	100	25	1,5	65	39	11	<b>1309 K</b>	<b>H309</b>	1,19
	45	100	36	1,5	65	50	11	<b>2309 K</b>	<b>H2309</b>	1,48
<b>45</b>	50	90	20	1,1	70	35	12	<b>1210 K</b>	<b>H210</b>	0,789
	50	90	23	1,1	70	42	12	<b>2210 K</b>	<b>H310</b>	0,88
	50	90	23	1,1	70	42	12	<b>2210 K2RS</b>	<b>H310</b>	0,88
	50	110	27	2	70	42	12	<b>1310 K</b>	<b>H310</b>	1,49
	50	110	40	2	70	55	12	<b>2310 K</b>	<b>H2310</b>	1,96
<b>50</b>	55	100	21	1,5	75	37	12	<b>1211 K</b>	<b>H211</b>	1
	55	100	25	1,5	75	45	12	<b>2211 K</b>	<b>H311</b>	1,2
	55	120	29	2	75	45	12	<b>1311 K</b>	<b>H311</b>	1,91
	55	120	43	2	75	59	12	<b>2311 K</b>	<b>H2311</b>	2,47
<b>55</b>	60	110	22	1,5	80	38	13	<b>1212 K</b>	<b>H212</b>	1,03
	60	110	28	1,5	80	47	13	<b>2212 K</b>	<b>H312</b>	1,55
	60	130	31	2,1	80	47	13	<b>1312 K</b>	<b>H312</b>	2,32
	60	130	46	2,1	80	62	13	<b>2312 K</b>	<b>H2312</b>	3,01
<b>60</b>	65	120	23	1,5	85	40	14	<b>1213 K</b>	<b>H213</b>	1,53



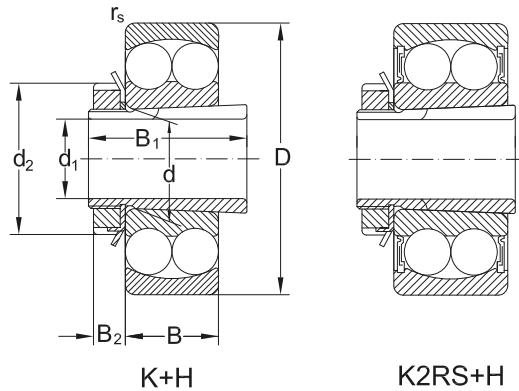
K2RS+H

Basic radial load.			Factors			Speed limit	
dyn. $C_r$	e	$\gamma_1$	$\gamma_2$	stat. $C_{0r}$	$\gamma_0$	grease	oil
kN	-			kN	-	$\text{min}^{-1}$	
9,9	0,28	2,2	3,5	2,65	2,4	15000	18000
12,6	0,28	2,2	3,5	3,3	2,4	14000	17000
12,4	0,3	2,1	3,3	3,35	2,2	12000	15000
18,2	0,52	1,2	1,9	4,7	1,3	11000	14000
12,2	0,29	2,2	3,4	3,3	2,3	13000	16000
12,5	0,43	1,5	2,3	3,45	1,6	11000	14000
12,2	0,29	2,2	3,4	3,3	2,3	7000	
17,8	0,28	2,2	3,5	4,9	2,4	9500	12000
24,5	0,44	1,4	2,2	6,55	1,5	9500	12000
15,7	0,25	2,5	3,9	4,7	2,7	10000	13000
15,3	0,4	1,6	2,5	4,6	1,7	9500	12000
15,7	0,25	2,5	3,9	4,7	2,7	5300	
21,4	0,24	2,6	4,1	6,35	2,8	9000	11000
31,4	0,4	1,6	2,5	8,7	1,7	8500	10000
15,8	0,23	2,8	4,2	5,15	2,9	9000	11000
21,7	0,37	1,7	2,6	6,7	1,8	8500	10000
15,8	0,23	2,8	4,2	5,15	2,9	5600	
25,1	0,25	2,5	3,9	7,95	2,7	7500	9000
39,7	0,43	1,5	2,3	12,9	1,6	7000	8500
19,2	0,22	2,9	4,5	6,5	3	8500	10000
22,4	0,33	1,9	3	7,4	2	7500	9000
19,2	0,22	2,9	4,5	6,5	3	4800	
29,5	0,24	2,6	4,1	9,75	2,8	6700	8000
44,9	0,39	1,6	2,5	15,1	1,7	6300	7500
21,8	0,21	3	4,7	7,4	3,2	7500	9000
23,3	0,31	2	3,1	8,15	2,1	7000	8500
21,8	0,21	3	4,7	7,4	3,2	4500	
37,7	0,24	2,6	4,1	12,9	2,8	6300	7500
54,1	0,31	2	3,1	16,5	2,1	5600	6700
22,9	0,21	3	4,7	8,16	3,2	7000	8500
23,3	0,29	2,2	3,4	8,5	2,3	6300	7500
22,9	0,21	3	4,6	8,1	3,2	4000	
43,4	0,24	2,6	4,1	14,2	2,8	5600	6700
64,4	0,42	1,5	2,3	20	1,6	5300	6300
26,6	0,2	3,2	4,1	10,1	3,3	6300	7500
26,5	0,27	2,3	3,6	9,9	2,5	6000	7000
51,3	0,23	2,8	4,2	18,1	2,9	5000	6000
75,3	0,41	1,5	2,4	23,8	1,6	4800	5600
30,2	0,19	3,4	5,2	11,6	3,5	5600	6700
33,8	0,28	2,2	3,5	12,6	2,4	5300	6300
57,1	0,23	2,8	4,2	20,8	2,9	4500	5300
87,1	0,41	1,5	2,4	28	1,6	4300	5000
31	0,17	3,7	5,7	12,4	3,9	5300	6300

## Self-aligning ball bearings with adapter sleeve



Dimensions								Designation		Mass
$d_1$	$d$	$D$	$B$	$r_s$ min.	$d_2$	$B_1$	$B_2$	bearing	adapter sleeve	
mm								-		Kg
<b>60</b>	65	120	31	1,5	85	50	14	<b>2213 K</b>	<b>H313</b>	2,00
	65	140	33	2,1	85	50	14	<b>1313 K</b>	<b>H313</b>	2,87
	65	140	48	2,1	85	65	14	<b>2313 K</b>	<b>H2313</b>	3,71
<b>65</b>	75	130	25	1,5	98	43	15	<b>1215 K</b>	<b>H215</b>	2,05
	75	130	31	1,5	98	55	15	<b>2215</b>	<b>H315</b>	2,52
	75	160	37	2,1	98	55	15	<b>1315 K</b>	<b>H315</b>	4,34
	75	160	55	2,1	98	73	15	<b>2315 K</b>	<b>H2315</b>	5,66
<b>70</b>	80	140	26	2	105	46	17	<b>1216 K</b>	<b>H216</b>	2,52
	80	140	33	2	105	59	17	<b>2216 K</b>	<b>H316</b>	3,18
	80	170	39	2,1	105	59	17	<b>1316 K</b>	<b>H316</b>	5,33
	80	170	58	2,1	105	78	17	<b>2316 K</b>	<b>H2316</b>	7,24
<b>75</b>	85	150	28	2	110	50	18	<b>1217 K</b>	<b>H217</b>	3,06
	85	150	36	2	110	63	18	<b>2217 K</b>	<b>H317</b>	3,85
	85	180	41	3	110	63	18	<b>1317 K</b>	<b>H317</b>	6,27
	85	180	60	3	110	82	18	<b>2317 K</b>	<b>H2317</b>	8,34
<b>80</b>	90	160	30	2	120	52	18	<b>1218 K</b>	<b>H218</b>	3,67
	90	160	40	2	120	65	18	<b>2218 K</b>	<b>H318</b>	4,74
	90	190	43	3	120	65	18	<b>1318 K</b>	<b>H318</b>	7,36
	90	190	64	3	120	86	18	<b>2318 K</b>	<b>H2318</b>	9,94
<b>85</b>	95	170	32	2,1	125	55	19	<b>1219 K</b>	<b>H219</b>	4,42
	95	200	45	3	125	68	19	<b>1319 K</b>	<b>H319</b>	8,30
<b>90</b>	100	180	34	2,1	130	58	20	<b>1220 K</b>	<b>H220</b>	5,13
	100	180	46	2,1	130	71	20	<b>2220 K</b>	<b>H320</b>	6,63
	100	215	47	3	130	71	20	<b>1320 K</b>	<b>H320</b>	9,96
	100	215	73	3	130	97	20	<b>2320 K</b>	<b>H2320</b>	14,3
<b>100</b>	110	200	38	2,1	145	63	21	<b>1222 K</b>	<b>H222</b>	7,00
	110	200	53	2,1	145	77	21	<b>2222 K</b>	<b>H322</b>	9,15
	110	240	50	3	145	77	21	<b>1322 K</b>	<b>H322</b>	13,9



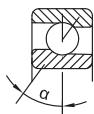
dyn. $C_r$	e	Factors		stat. $C_{0r}$	$\gamma_0$	Speed limit	
		$\gamma_1$	$\gamma_2$			grease	oil
kN	-			kN	-	min <sup>-1</sup>	
43,6	0,28	2,2	3,5	16,4	2,4	5000	6000
62	0,23	2,8	4,2	22,9	2,8	4300	5000
95,6	0,38	1,7	2,6	32,5	1,7	4000	4800
38,9	0,18	3,5	5,4	15,6	3,7	4800	5600
44	0,25	2,5	3,9	17,8	2,7	4500	5300
79,2	0,22	2,9	4,5	30	3	3600	4300
123	0,38	1,7	2,6	42,8	1,7	4300	4000
39,8	0,16	3,9	6,1	17	4,1	4300	5000
48,8	0,26	2,4	3,7	19,9	2,5	4000	4800
88,4	0,22	2,9	4,5	33	3	3400	4000
136	0,34	1,9	2,9	48,5	2	3200	3800
48,8	0,17	3,7	5,7	20,8	3,9	4000	4800
58,5	0,25	2,5	3,9	23,8	2,7	3800	4500
97,5	0,22	2,9	4,5	37,9	3	3200	3800
140	0,37	1,7	2,6	51,5	1,8	3000	3600
57	0,17	3,7	5,7	23,1	3,9	3800	4500
70,2	0,27	2,3	3,6	27,2	2,5	3600	4300
117	0,22	2,9	4,5	44,5	3	3000	3600
153	0,38	1,7	2,6	57,7	1,7	2800	3400
63,7	0,17	3,7	5,7	24,3	3,9	3400	4000
133	0,23	2,8	4,2	50,8	2,9	2800	3400
68,9	0,17	3,7	5,7	29,7	3,9	3200	3800
97,5	0,24	2,6	4,1	34	2,8	2200	3800
143	0,24	2,6	4,1	57,3	2,8	2600	3200
193	0,34	1,9	2,9	73,4	2	2400	3000
88	0,17	3,7	5,7	35,2	3,9	2800	3400
124	0,26	2,4	3,7	48,9	2,5	2800	3400
163	0,22	2,9	4,5	67,5	3	2400	3000



# Angular contact ball bearings, single row

Single row angular contact bearings are manufactured in various constructive versions, with various contact angles, depending on the application. Bearings series 72B and 73B for general applications have a contact angle  $\alpha = 40^\circ$ . Bearings series 718, 719, 70 and 72 generally used

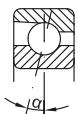
for tool-holders, have phenol resins (textolite) cages or machined brass cages. Those with bore diameters up to  $d = 100$  mm are manufactured to tolerance classes P5, P4 and P2 and have a contact angle of  $15^\circ(C)$  and  $25^\circ(A)$  respectively.



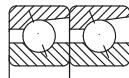
Series 72B, 73B  
Contact angle  $\alpha = 40^\circ$



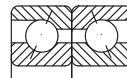
Series 70A, 72A  
Contact angle  $\alpha = 25^\circ$



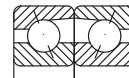
Series 70C, 72C  
Contact angle  $\alpha = 15^\circ$



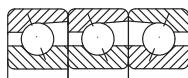
DT arrangement (Tandem)



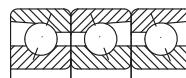
DB arrangement  
(Back-to-back)



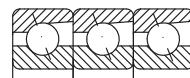
DF arrangement  
(Face-to-face)



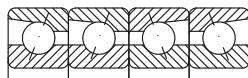
TFT arrangement



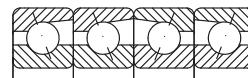
TBT arrangement



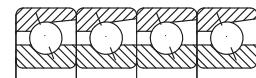
TT arrangement



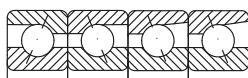
QBC arrangement



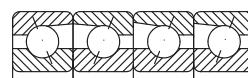
QFC arrangement



QT arrangement



QBT arrangement



QFT arrangement

## Suffixes

- A** - bearing with extended outer ring  
**A** - bearing with contact angle  $\alpha = 25^\circ$   
**B** - bearing with extended outer ring  
**B** - bearing with contact angle  $\alpha = 40^\circ$   
**BB** - bearing with  $\alpha = 40^\circ$  and extended inner ring  
**C** - bearing with contact angle  $\alpha = 15^\circ$   
**CA** - bearing with radial clearance smaller than normal  
**CB** - bearing with normal radial clearance  
**CC** - radial bearing with axial clearance larger than normal  
**D** - two bearings set  
**D** - bearing with two-pieces inner ring  
**DB** - two bearings set in back-to-back arrangement, (O)  
**DF** - two bearings set in face-to-face arrangement, (X)  
**DT** - two bearings set in tandem arrangement  
**E** - bearing with contact angle  $\alpha = 20^\circ$   
**FA** - bearing with machined cage of steel or cast iron, guided in the outer ring  
**FB** - bearing with machined cage of steel or cast iron, guided on the inner ring  
**GA** - light preload, bearings series 72B, 73B  
**GB** - moderate preload, bearings series 72B, 73B  
**GC** - heavy preload, bearings series 72B, 73B  
**L** - light preload, bearings series 70C, 70A, 72A  
**M** - moderate preload, bearings series 70C, 70A, 72A  
**M** - machined brass cage, ball guided  
**MA** - machined brass cage, guided in the outer ring  
**MB** - machined brass cage, guided in the inner ring  
**O** - bearing set without axial clearance  
**P0** - normal tolerance class  
**P6** - tolerance class more accurate than normal  
**P5** - tolerance class more accurate than P6  
**P4** - tolerance class more accurate than P5  
**P2** - tolerance class more accurate than P4  
**Q** - four bearings set  
**QBC** - tandem pairs in O arrangement  
**QBT** - tandem pairs plus O arrangement  
**QFC** - tandem pairs in X arrangement  
**QFT** - tandem pairs plus X arrangement  
**QT** - tandem pairs  
**S** - heavy preload, bearings series 70C, 70A, 72A  
**S0** - bearings operating up to a temperature of + 150°C  
**S1** - bearings operating up to a temperature of + 200°C  
**T** - three bearings set  
**T** - bearing set total width (T168, T200)

- TBT** - three bearings set in O arrangement, plus T  
**TFT** - three bearings set in X arrangement, plus T  
**TT** - three bearings set in tandem arrangement  
**TN** - polyamide cage  
**V** - full complement bearing  
**U** - bearings of universal design, with deviations of d and D and  $K_i$ ,  $K_e$  in P2 class  
**UA** - bearings with small axial clearance at DB and DF arrangements  
**UL** - bearings with light preload at DB and DF arrangements  
**UO** - bearings without small axial clearance at DB and DF arrangements  
**UP** - tolerance class with deviations of d and D in P4 class and of  $K_i$  and  $K_e$  in P2 class.

Single row angular contact ball bearings can take only one direction axial loads. When being radially loaded, in bearing occurs an axially acting load which has to be compensated.

For this reason, a bearing or paired bearings are mounted on each shaft end.

Single row angular contact ball bearings with B suffix have a contact angle  $\alpha = 40^\circ$  and are suitable in case of heavy loads.

These bearings are not dismountable and their use at relatively high speeds is allowed.

Pair mounting of bearings as shown in figures on page 156 is used when the load carrying capacity of a single bearing is inadequate (tandem arrangement), respectively when axial loads have to be taken in both directions (DB or DF arrangements).

In case of DT tandem arrangement, the contact lines are in parallel. Radial and axial loads are uniformly distributed on both bearings. The bearing pair can take axial loads in only one direction. Therefore, a third bearing should take axial loads in the opposite direction.

DB arrangement is considered to be a relatively stiff arrangement and can also take tilting moments.

The contact lines of DF arrangement converge towards the bearing axis and form letter "X". Axial loads are taken in the same way as in case of DB arrangement, but the arrangement is not so stiff and it is less suitable for taking tilting moments.

## Universal design

Single row angular contact ball bearings of universal design are suitable for DB, DF and DT arrangements.

Bearings of universal design are manufactured



to more accurate tolerance classes and can be matched if the mounting conditions UA, UO and UL are observed.

The values of clearance or preload are obtained when the shaft is manufactured to tolerance class J5 and the housing bore to tolerance class J6.

## Dimensions

Main dimensions of bearings given in tables are in accordance with ISO 15.

## Misalignment

In case of single row angular contact ball bearings the conditions regarding the permissible error of alignment of the outer ring relative to the inner ring are as complex as for single row deep groove ball bearings.

When the bearings are paired in DB arrangement, angular misalignments of the outer ring in relation to the inner ring can only be accommodated between the balls and raceways by force, leading to a reduction in bearing life.

## Tolerances

Single row angular contact ball bearings of series 72B and 73B, with a contact angle  $\alpha = 40^\circ$  (B) are generally manufactured to the normal tolerance class.

At request, they also can be manufactured to normal tolerance classes P6 and P5.

Single row angular contact ball bearings of high accuracy, series 70C, 72C, 70A and 72A, with a contact angle  $\alpha = 15^\circ$  (C) and  $\alpha = 25^\circ$  are manufactured to tolerance classes SP, P4, UP and P2.

The deviations of bore diameter, outside diameter and width of high accuracy single row angular contact ball bearings of universal design (UL) are given in table 1.

In case of single row angular contact ball bearings manufactured and delivered in sets of 2, 3 or 4 bearings, outside and bore diameter should be chosen considering the mean tolerance values, which are given on the package.

**Deviation of main dimensions of high accuracy row angular contact bearings**

Deviations in  $\mu\text{m}$

Table 1

Bore d		$\Delta_{\text{dmp}}, \Delta_{\text{Dmp}}$				$\Delta_{\text{BS}}$			
over	up to	low	high	low	high	low	high	low	high
(mm)		P4	UP		P2				
-	<b>18</b>	-3	-1	-3	-1	-2	0	-250	0
<b>18</b>	<b>30</b>	-3,5	-1,5	-3	-1	-2	0	-250	0
<b>30</b>	<b>50</b>	-4	-1,5	-3	-1	-2	0	-250	0
<b>50</b>	<b>80</b>	-5	-2	-3,5	-1,5	-3	-1	-250	0
<b>80</b>	<b>120</b>	-5,5	-2			-3,5	-1,5	-380	0

## Contact angle

In case of single row angular contact ball bearings, the efforts between rings and rolling elements (contact points of rolling elements / outer or inner ring) are transmitted at an angle  $\alpha (<90^\circ)$  to a plane perpendicular to the bearing axis.

The value of this angle depends on the magnitude of the raceway radius, rolling element diameter and radial clearance in bearing, when the curvature centres of the raceway in the outer or in the inner ring are in the same plane.

High accuracy single row angular contact ball bearings series 70C, 70A and 72A, with a contact angle  $\alpha = 15^\circ$  (C) and  $\alpha = 25^\circ$  (A), which are generally used for grinding stone holders, paired mounted in DB and DF arrangement, are manufactured with an initial preload. It can be: light (L), moderate (M), heavily (S). The values of these preloads are given in table 3.

## Axial clearance - preload

Axial clearance or preload can be obtained only when single row angular contact ball bearings is mounted in the assembly and depends on the location of the second bearing which assures the shaft axial guiding.

Single row angular contact ball bearings series 72B and 73B, paired mounted in DB and DF arrangements are manufactured with normal axial clearance CB, smaller than normal, CA, larger than normal, CC, or with light preload, GA, moderate preload GB, or heavy preload, GC, according to the values given in table 2.

Axial clearance or preload of single row angular contact ball bearings series 72B and 73B, pair mounted in DB or DF arrangements														
Bore d	Axial clearance					Preload								
	CA	CB	CC	GA	GB	GC	GB	GC	GB	GC	GB	GC	GB	GC
	over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
mm	µm						N	µm	N	µm	N	µm	N	µm
-	10	4	12	14	22	22	30	-	-	-	-	-	-	-
10	18	5	13	15	23	24	32	+4	-4	80	-2	-10	30	330
18	30	7	15	18	26	32	40	+4	-4	120	-2	-10	40	480
30	50	9	17	22	30	40	48	+4	-4	160	-2	-10	60	630
50	80	11	23	26	38	48	60	+6	-6	380	-3	-15	140	1500
80	120	14	26	32	44	55	67	+6	-6	410	-3	-15	150	1600
120	180	17	29	35	47	62	74	+6	-6	540	-3	-15	200	2150
180	250	21	37	45	61	74	90	+8	-8	940	-4	-20	330	3700
250	315	26	42	52	68	90	106	+8	-8	1080	-4	-20	380	4250

High accuracy single row angular contact ball bearings series 70C, 70A and 72A, with a contact angle  $\alpha = 15^\circ$  (C) and  $\alpha = 25^\circ$  (A), which are generally used for grinding stone holders,

paired mounted in DB and DF arrangement, are manufactured with an initial preload. It can be: light (L), moderate (M), heavy (S). The values of these preloads are given in table 3.

Values of axial preload of bearings of series 70C, 70A and 72A, in DB and DF arrangements														
Bore d	Symbol	Axial preload Series 70C			Series 72C			Series 70A			Series 72A			
		L	M	S	L	M	S	L	M	S	L	M	S	
mm	-	N												
10	00	15	30	60	20	40	80	25	50	100	35	70	140	
12	01	15	30	60	20	40	80	25	50	100	35	70	140	
15	02	20	40	80	30	60	120	30	60	120	45	90	180	
17	03	25	50	100	35	70	140	40	80	160	60	120	240	
20	04	35	70	140	45	90	180	50	100	200	70	140	280	
25	05	35	70	140	50	100	200	60	120	240	80	160	320	
30	06	50	100	200	90	180	360	90	180	360	150	300	600	
35	07	60	120	240	120	240	480	90	180	360	190	380	760	
40	08	60	120	240	150	300	600	100	200	400	240	480	960	
45	09	110	220	440	160	320	640	170	340	680	260	520	1040	
50	10	110	220	440	170	340	680	180	360	720	260	520	1040	
55	11	150	300	600	210	420	840	230	460	920	330	660	1320	
60	12	150	300	600	250	500	1000	240	480	960	400	800	1600	
65	13	160	320	640	290	580	1160	240	480	960	450	900	1800	
70	14	200	400	800	300	600	1200	300	600	1200	480	960	1920	

**Values of axial preload of bearings of series 70C, 70A and 72A,  
in DB and DF arrangements**

Table 3 (continued)

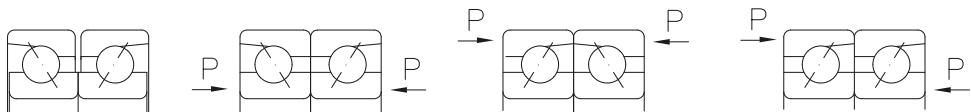
Bore <i>d</i>	Symbol	Axial preload Series 70C			Series 72C			Series 70A			Series 72A		
		L	M	S	L	M	S	L	M	S	L	M	S
mm	-	N											
75	15	200	400	800	310	620	1240	310	620	1240	500	1000	2000
80	16	240	480	960	370	740	1480	390	780	1560	580	1160	2320
85	17	250	500	1000	370	740	1480	400	800	1600	600	1200	2400
90	18	300	600	1200	480	960	1920	460	920	1840	750	1500	3000
95	19	310	620	1240	520	1040	2080	480	960	1920	850	1700	3400
100	20	310	620	1240	590	1180	2360	500	1000	2000	950	1900	3800
105	21	360	720	1440	650	1300	2600	560	1120	2240	1000	2000	4000
110	22	420	840	1680	670	1340	2680	650	1300	2600	1050	2100	4200
120	24	430	860	1720	750	1500	3000	690	1380	2760	1200	2400	4800
130	26	560	1120	2240	800	1600	3200	900	1800	3600	1250	2500	5000
140	28	570	1140	2280	-	-	-	900	1800	3600	-	-	-
150	30	650	1300	2600	-	-	-	1000	2000	4000	-	-	-
160	32	730	1460	2920	-	-	-	1150	2300	4600	-	-	-
170	34	800	1600	3200	-	-	-	1250	2500	5000	-	-	-
180	36	900	1800	3600	-	-	-	1450	2900	5800	-	-	-
190	38	950	1900	3800	-	-	-	1450	2900	5800	-	-	-

Designs of single row angular contact ball bearings with clearance or initial preload are given in the figures below.

Before mounting (preload)



After mounting (preload)



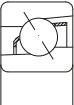
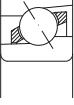
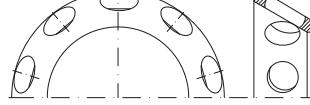
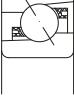
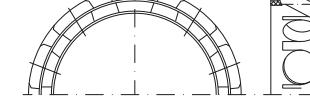
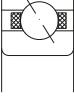
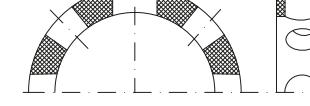
### Cages

Single row angular contact ball bearings series 72B and 73B are generally fitted with pressed sheet cages.

High precision single row angular contact ball bearings series 70C, 72C, 70A and 72A are fitted with textolite cages (textile fibre reinforced phenol resins).

At special request (high speeds, large sizes), bearings series 70C, 72C, 70A and 72A are fitted with machined brass cages. Cages of glass fibre reinforced polyamide 6.6 are also used with good results if operating temperature doesn't exceed +120°C.

Cages design and some technical data are given in table 4

Cages design and some technical data					Table 4
Cage	Design bearing	cage	Application	Max. value	
mm	-	N		D <sub>m</sub> n oil grease	
Pressed sheet cage				- General application - Moderate speeds - Bearings series 72B, 73B	600 x 10 <sup>3</sup> 450 x 10 <sup>3</sup>
Machined brass cage M, MA, MB				- General application - High speeds - Bearings: 7231B-7238B 7310B-7338B	1100 x 10 <sup>3</sup> 800 x 10 <sup>3</sup>
Polyamide cage TN				- General application - Low friction moment - High speeds	1100 x 10 <sup>3</sup> 900 x 10 <sup>3</sup>
Textolite cage T, TA, TB				- High accuracy bearings series: 70C, 72C, 70A, 72A - High speeds - Low vibration level	1200 x 10 <sup>3</sup> 900 x 10 <sup>3</sup>

These equations are available for bearings mounted without clearance and without preload (clearance equal to zero).

For single row angular contact ball bearings series 70C and 72C with a contact angle  $\alpha = 15^\circ(C)$ , single or in DT arrangement, the following equations are available:

$$\begin{aligned} P_r &= F_r, \text{ kN}, & \text{when } F_a/F_r \leq 1,14, \\ P_r &= 0,35 F_r + 0,57 F_a, \text{ kN}, & \text{when } F_a/F_r > 1,14 \end{aligned}$$

For bearings in DB or DF arrangement

$$\begin{aligned} P_r &= F_r + 0,65 F_a, \text{ kN} & \text{when } F_a/F_r \leq 1,14 \\ P_r &= 0,57 F_r + 0,93 F_a, \text{ kN}, & \text{when } F_a/F_r > 1,14 \end{aligned}$$

$$\begin{aligned} P_r &= F_r, \text{ kN}, & \text{for } F_a/F_r \leq e, \\ P_r &= 0,44 F_r + Y F_a, \text{ kN}, & \text{for } F_a/F_r > e \end{aligned}$$

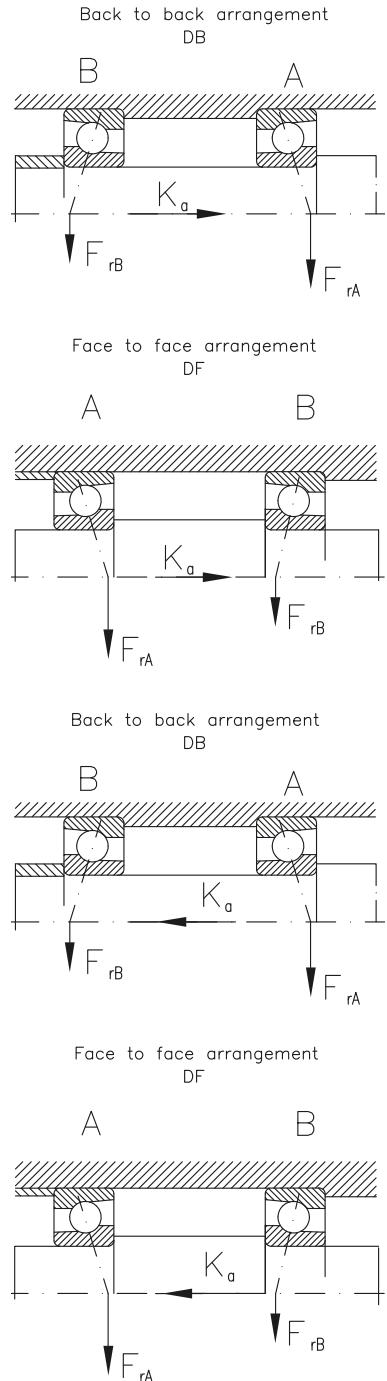
The values of factor  $Y$  depend on the values of the ratio  $f_0 i F_a/C_{0r}$  and are given in table 6. Factor  $f_0$  can be found in diagram in page 163 as a function of dimensions series and bearing mean diameter. "i" represents the number of bearings or bearings pairs in a bearing join.

For bearings in DB and DF arrangements, the following equations are available:

$$\begin{aligned} P_r &= F_r + Y_1 F_a, \text{ kN}, & \text{for } F_a/F_r \leq e, \\ P_r &= 0,72 F_r + Y_2 F_a, \text{ kN}, & \text{for } F_a/F_r > e \end{aligned}$$

The values of factors  $Y_1$  and  $Y_2$  depend on the ratio  $f_0 i F_a/C_{0r}$  and are given in table 6 ( $f_0$  from diagram below).

URB



Determination of axial loads		Table 5
Loading version	Axial load	
1a) $F_{rA} \geq F_{rB}$ $K_a \geq 0$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} + K_a$	
1b) $F_{rA} < F_{rB}$ $K_a \geq 1,14 (F_{rB} - F_{rA})$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} + K_a$	
1c) $F_{rA} < F_{rB}$ $K_a \leq 1,14 (F_{rB} - F_{rA})$	$F_{aB} = F_{aB} - K_a$ $F_{aB} = 1,14 F_{rB}$	
2a) $F_{rA} \leq F_{rB}$ $K_a \geq 0$	$F_{aB} = F_{aB} + K_a$ $F_{aB} = 1,14 F_{rB}$	
2b) $F_{rA} > F_{rB}$ $K_a \geq 1,14 (F_{rA} - F_{rB})$	$F_{aB} = F_{aB} + K_a$ $F_{aB} = 1,14 F_{rB}$	
2c) $F_{rA} > F_{rB}$ $K_a < 1,14 (F_{rA} - F_{rB})$	$F_{aA} = 1,14 F_{rA}$ $F_{aB} = F_{aA} - K_a$	

For single row angular contact ball bearings series 70A and 72A, with a contact angle  $\alpha = 25^\circ$ , single or in DT arrangement, the following equation are available:

$$P_r = F_r, \text{ kN}, \quad \text{for } F_a/F_r \leq 0,68$$

$$P_r = 0,41 F_r + 0,87 F_a, \text{ kN}, \quad \text{for } F_a/F_r > 0,68$$

For bearings in DB and DF arrangement, the following equations are available:

$$P_r = F_r + Y_1 F_a, \text{ kN}, \quad \text{for } F_a/F_r \leq e$$

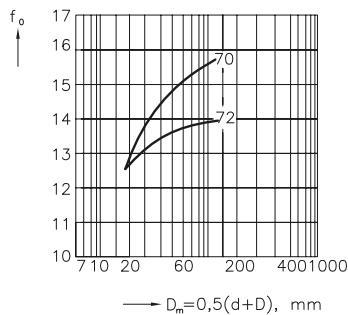
$$P_r = 0,72 F_r + Y_2 F_a, \text{ kN}, \quad \text{for } F_a/F_r > e$$

Values for  $Y_1$  and  $Y_2$  are given in table 6.

**Values of factors  $e$ ,  $Y$ ,  $Y_1$  and  $Y_2$**

Table 6

$f_0 i F_a$ $C_{0r}$	Single and DT		Arrangement DB or DF	
	$e$	$Y$	$Y_1$	$Y_2$
<b>0,2</b>	0,38	1,46	1,64	2,37
<b>0,4</b>	0,41	1,36	1,52	2,21
<b>0,8</b>	0,44	1,28	1,44	2,11
<b>1,6</b>	0,48	1,16	1,31	1,90
<b>3</b>	0,52	1,08	1,21	1,78
<b>6</b>	0,56	1	1,12	1,66



## Equivalent static load

For single row angular contact ball bearings series 72B and 73B with a contact angle  $\alpha = 40^\circ$ , single and in DT arrangement, the following equation is available:

$$P_{0r} = 0,6 F_r + 0,26 F_a, \text{ kN}$$

If  $P_{0r} < F_r$ , then we consider  $P_0 = F_r$

For bearings in DB and DT arrangement, the following equation is available:

$$P_{0r} = F_r + 0,52 F_a, \text{ kN}$$

For single row angular contact ball bearings

series 70C and 72C, with a contact angle  $\alpha = 15^\circ$ , single and in DT arrangement, the following equation is available:

$$P_{0r} = 0,5 F_r + 0,46 F_a, \text{ kN}$$

For bearings in DB and DF arrangement, the following equation is available:

$$P_{0r} = 0,5 F_r + 0,92 F_a, \text{ kN}$$

For single row angular contact ball bearings series 70A and 72A with a contact angle  $\alpha = 25^\circ$ , single and in DT arrangement, the following equation is available:

$$P_{0r} = 0,5 F_r + 0,38 F_a, \text{ kN}$$

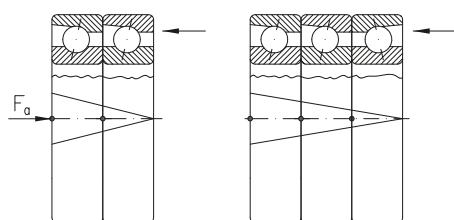
For bearings in DB and DF arrangement, the following equation is available:

$$P_{0r} = F_r + 0,76 F_a, \text{ kN}$$

Two "V" scratches are marked on the outside surface where the runout is maximum, i.e. where the outer ring thickness is maximum, so that the bearings of a set can be mounted in the manufacturing order. The place of maximum runout is marked on the chamfer between the inner ring bore and side face. Thus, the possible fit ovalnesses on the shaft can be compensated.

Every set is delivered as an unit, separately packed. In each unit, bearings are singly packed.

If distance rings are necessary to be mounted between bearings, they have not to be adjusted when being mounted. There is only one condition to be observed: the inner distance ring width should be equal to that of the outer ring, the side faces being parallel to each other. This can be easily done if both distance rings are simultaneously ground on a grinding and lapping machine. If bearings are mounted with distance rings, the mounting is also done observing the "V" marked as mentioned above. The cone vertex should be on the ring side opposite to that one on which the load acts (see next figure).



## Basic dynamic load of paired bearings

Basic dynamic load given in bearings tables is valid for each single bearing. Basic dynamic load of a paired bearings set can be determined according to the specifications on page 21.

## Basic static load of paired bearings

Basic static load of paired bearings can be similarly determined, multiplying the values of  $C_0$  in the tables by 2, 3 and 4 respectively.

## Bearing speed limit

Single row angular contact ball bearings are used at high speeds.

High precision bearings allow operation at higher speeds than those in the catalogue, depending on the oil lubrication system (oil bath, dropping lubrication, oil spot, with oil cooling).

The values of speeds for bearings series 72B and 73B, normal tolerance class, without preload are given in this catalogue.

In case of preloaded bearings, for single mounted bearing and bearings in DB, DF or DT arrangements, speed should be multiplied by the coefficients in table 7.

For bearings series 70C, 72C, 70A and 72A, speeds are given for the tolerance class P4 and light preload.

In case of bearings with other values of preloads or arrangements of 3 or 4 bearing sets, the speeds of the bearing of basic design should be multiplied by the values of the coefficients in table 7.

### Speed limit reduction factor

Table 7

Arrangement	Bearing preload			
	UA, UO	L	M	S
Single	1,0	1,0	0,90	0,80
Tandem, DT	0,90	0,90	0,80	0,65
Back-to-back, DB	0,80	0,80	0,70	0,55
Face-to-face, DF	0,80	0,75	0,60	0,40
Three bearings set	0,75	0,70	0,55	0,35
Four bearings set	0,70	0,65	0,45	0,25

## Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum connection radius  $r_{u \max}$  should be less than bearing minimum mounting chamfer  $r_{1\min}, r_{2\min}$ .

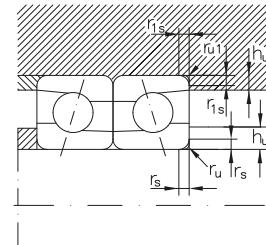
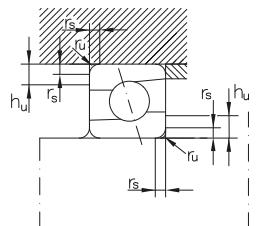
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connection radii and support shoulder height are given in table 8.

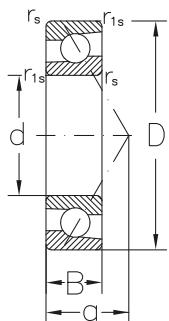
### Abutment dimensions

Table 8

$r_s, r_{1s}$ min	$r_u, r_{u1}$ max	$h_u, h_{u1}$ min	Bearing series
			718, 728, 72
			719, 729, 73
			70
<b>mm</b>			
<b>0,3</b>	0,3	1	1,2
<b>0,6</b>	0,6	1,6	2,1
<b>1</b>	1	2,3	2,6
<b>1,1</b>	1	3	3,5
<b>1,5</b>	1,5	3,5	4,5
<b>2</b>	2	4,4	5,5
<b>2,1</b>	2,1	5,1	6
<b>3</b>	2,5	6,2	7
<b>4</b>	3	7,3	8,5

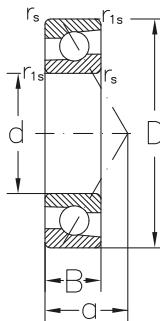


## Angular contact ball bearings, single row



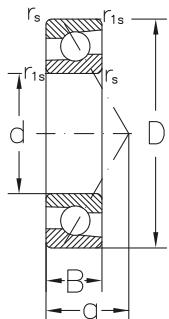
Dimensions						Basic radial load dyn. $C_r$	Speed limit stat. $C_{0r}$	Designation	Mass
d	D	B	$r_s$ min.	$r_{1s}$ min.	a				
						kN	min <sup>-1</sup>	-	Kg
<b>10</b>	30	9	0,6	0,3	13	4,95	2,5	19000	28000
<b>12</b>	32	10	0,6	0,3	14	7,4	3,75	17000	24000
<b>15</b>	35	11	0,6	0,3	16	7,45	3,9	16000	22000
	35	11	0,6	0,3	16	7,45	3,9	16000	22000
	35	11	0,6	0,3	16	7,45	3,9	16000	22000
	42	13	1	0,6	19	12,9	6,5	14000	19000
<b>17</b>	40	12	0,6	0,6	18	11	6,1	14000	19000
	40	12	0,6	0,6	18	11	6,1	14000	19000
	40	12	0,6	0,6	18	11	6,1	14000	19000
	47	14	1	0,6	21	14,8	8,1	12000	17000
<b>20</b>	47	14	1	0,6	21	14,1	8,4	11000	16000
	47	14	1	0,6	21	14,1	8,4	11000	16000
	47	14	1	0,6	21	14,1	8,4	11000	16000
	52	15	1,1	0,6	23	17,3	9,7	10000	15000
	52	15	1,1	0,6	23	17,3	9,7	10000	15000
<b>25</b>	52	15	1	0,6	24	15,5	10,1	9500	14000
	52	15	1	0,6	24	15,5	10,1	9500	14000
	52	15	1	0,6	24	15,5	10,1	9500	14000
	62	17	1,1	0,6	27	24,4	14,6	8500	12000
	62	17	1,1	0,6	27	24,4	14,6	8500	12000
	62	17	1,1	0,6	27	24,4	14,6	8500	12000
<b>30</b>	62	16	1	0,6	27	20,5	13,6	8500	12000
	62	16	1	0,6	27	20,5	13,6	8500	12000
	62	16	1	0,6	27	20,5	13,6	8500	12000
	62	16	1	0,6	27	20,5	13,6	8500	12000
	72	19	1,1	0,6	31	29,3	19	7500	10000
	72	19	1,1	0,6	31	29,3	19	7500	10000
	72	19	1,1	0,6	31	29,3	19	7500	10000
	72	19	1,1	0,6	31	29,3	19	7500	10000
<b>35</b>	72	17	1,1	0,6	31	28,5	19,8	7500	10000
	72	17	1,1	0,6	31	28,5	19,8	7500	10000
	80	21	1,5	1	35	36,7	24,3	7000	9500
	80	21	1,5	1	35	36,7	24,3	7000	9500
<b>40</b>	80	18	1,1	0,6	34	32,1	23	6700	9000
	80	18	1,1	0,6	34	32,1	23	6700	9000
	80	18	1,1	0,6	34	32,1	23	6700	9000
	90	23	1,5	1	39	44,8	30,3	6300	8500
	90	23	1,5	1	39	44,8	30,3	6300	8500
<b>45</b>	90	23	1,5	1	39	44,8	30,3	6300	8500
	85	19	1,1	0,6	37	36,1	26,2	6300	8500
								<b>7209 B</b>	0,440

## Angular contact ball bearings, single row



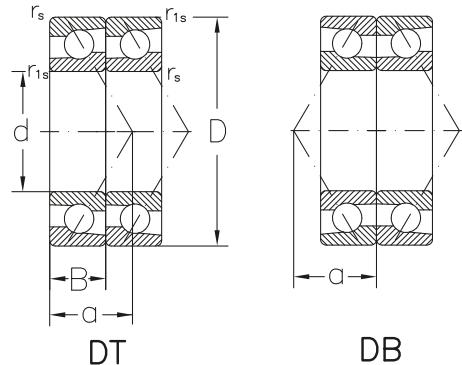
Dimensions						Basic radial load dyn. $C_r$	Speed limit stat. $C_{0r}$	Designation	Mass Kg
d	D	B	$r_s$ min.	$r_{1s}$ min.	a				
						kN	min <sup>-1</sup>	-	
<b>45</b>	85	19	1,1	0,6	37	36,1	26,2	6300	8500 <b>7209 BP5</b> 0,440
	100	25	1,5	1	43	58,3	40,1	5600	7500 <b>7309 B</b> 0,900
	100	25	1,5	1	43	58,3	40,1	5600	7500 <b>7309 BP6</b> 0,900
	100	25	1,5	1	43	58,3	40,1	5600	7500 <b>7309 BP5</b> 0,900
<b>50</b>	90	20	1,1	0,6	39	37,4	28,6	5600	7500 <b>7210 B</b> 0,490
	90	20	1,1	0,6	39	37,4	28,6	5600	7500 <b>7210 BP6</b> 0,490
	90	20	1,1	0,6	39	37,4	28,6	5600	7500 <b>7210 BP5</b> 0,490
	110	27	2	1	47	68,2	47,9	5000	6700 <b>7310 B</b> 1,15
	110	27	2	1	47	68,2	47,9	5000	6700 <b>7310 BP6</b> 1,15
	110	27	2	1	47	68,2	47,9	5000	6700 <b>7310 BP5</b> 1,15
<b>55</b>	100	21	1,5	1	43	46,2	36,2	5300	7000 <b>7211 B</b> 0,650
	120	29	2	1	52	78,8	56,4	4500	6000 <b>7311 B</b> 1,45
<b>60</b>	110	22	1,5	1	47	56,3	44,7	4800	6300 <b>7212 B</b> 0,840
	110	22	1,5	1	47	56,3	44,7	4800	6300 <b>7212 BP5</b> 0,840
	130	31	2,1	1,1	56	90	65,5	4300	5600 <b>7312 B</b> 1,85
	130	31	2,1	1,1	56	90	65,5	4300	5600 <b>7312 BP5</b> 1,85
<b>65</b>	120	23	1,5	1	50	63,6	52,5	4300	5600 <b>7213 B</b> 1,05
	120	23	1,5	1	50	63,6	52,5	4300	5600 <b>7213 BP6</b> 1,05
	120	23	1,5	1	50	63,6	52,5	4300	5600 <b>7213 BP5</b> 1,05
	140	33	2,1	1,1	60	101	75,3	4000	5300 <b>7313 B</b> 2,25
<b>70</b>	125	24	1,5	1	53	69,1	57,8	4300	5600 <b>7214 B</b> 1,15
	125	24	1,5	1	53	69,1	57,8	4300	5600 <b>7214 B</b> 1,15
	150	35	2,1	1,1	64	114	86	3800	5000 <b>7314 B</b> 2,75
	150	35	2,1	1,1	64	114	86	3800	5000 <b>7314 BP6</b> 2,75
	150	35	2,1	1,1	64	114	86	3800	5000 <b>7314 BP5</b> 2,75
	150	35	2,1	1,1	64	114	86	3800	5000 <b>7314 BTN</b> 2,75
<b>75</b>	130	25	1,5	1	56	74,8	63,2	4000	5300 <b>7215 B</b> 1,30
	130	25	1,5	1	56	74,8	63,2	4000	5300 <b>7215 BP6</b> 1,30
	130	25	1,5	1	56	74,8	63,2	4000	5300 <b>7215 BP5</b> 1,30
	160	37	2,1	1,1	68	125	97,5	3400	4500 <b>7315 B</b> 3,30
	160	37	2,1	1,1	68	125	97,3	3400	4500 <b>7315 BMP6</b> 3,30
	160	37	2,1	1,1	68	125	97,5	3400	4500 <b>7315 AMA</b> 3,30
<b>80</b>	140	26	2	1	59	80,5	69,3	3800	5000 <b>7216 B</b> 1,55
	170	39	2,1	1,1	72	135	109	3200	4300 <b>7316 B</b> 3,90
	170	39	2,1	1,1	72	135	109	3200	4300 <b>7316 BP6</b> 3,903
	170	39	2,1	1,1	72	135	109	3200	4300 <b>7316 BMP6</b> 3,903
<b>85</b>	150	28	2	1	64	93,1	81,1	3400	4500 <b>7217 B</b> 1,953
	180	41	3	1,1	76	145	122	3000	4000 <b>7317 B</b> 4,603
	180	41	3	1,1	76	145	122	3000	4000 <b>7317 BP6</b> 4,603
	180	41	3	1,1	76	145	122	3000	4000 <b>7317 BMP6</b> 4,603

## Angular contact ball bearings, single row



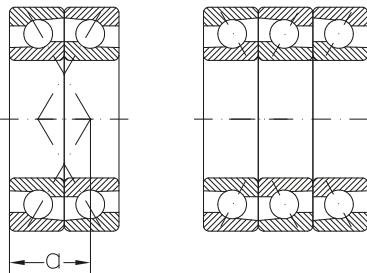
Dimensions						Basic radial load dyn. $C_r$	Speed limit stat. $C_{0r}$	Designation	Mass		
d	D	B	$r_s$ min.	$r_{1s}$ min.	a						
mm						kN	$\text{min}^{-1}$	-	Kg		
<b>90</b>	160	30	2	1	67	107	93,8	3200	4300	<b>7218 B</b>	2,403
	160	30	2	1	67	107	93,8	3200	4300	<b>7218 BMB</b>	2,403
	190	43	3	1,1	80	156	135	2800	3800	<b>7318 B</b>	5,403
<b>95</b>	170	32	2,1	1,1	71	116	101	3000	4000	<b>7219 B</b>	2,903
	200	45	3	1,1	84	168	150	2600	3600	<b>7319 B</b>	6,253
<b>100</b>	180	34	2,1	1,1	76	129	116	2800	3800	<b>7220 B</b>	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	<b>7220 BP6</b>	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	<b>7220 BMA</b>	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	<b>7220 BMAP6</b>	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	<b>7220 BMAP4</b>	3,453
	180	34	2,1	1,1	76	129	116	2800	3800	<b>7220 BMB</b>	3,453
	215	47	3	1,1	90	190	178	2400	3400	<b>7320 B</b>	7,753
	215	47	3	1,1	90	190	178	2400	3400	<b>7320 BP6</b>	7,753
	215	47	3	1,1	90	190	178	2400	3400	<b>7320 BM</b>	7,753
	200	38	2,1	1,1	84	153	145	2400	3400	<b>7222 B</b>	4,803
<b>110</b>	200	38	2,1	1,1	84	153	145	2400	3400	<b>7222 BMB</b>	4,803
	240	50	3	1,1	99	248	229	2000	3000	<b>7322 B</b>	10,53
	240	50	3	1,1	99	248	229	2000	3000	<b>7322 BP5</b>	10,53
	240	50	3	1,1	99	248	229	2000	3000	<b>7322 BM</b>	10,53
<b>140</b>	250	42	3	1,1	10,3	191	210	1700	2400	<b>7228 B</b>	8,803
	300	62	4	1,5	123	290	334	1700	2400	<b>7328 B</b>	21,63
	300	62	4	1,5	123	290	334	1700	2400	<b>7328 BMBP5</b>	21,63
<b>150</b>	190	24	1,1	0,6	35	60,5	79,2	2200	3000	<b>72830 CMA</b>	3,363
	270	45	3	1,1	111	195	222	2000	2800	<b>7230 BM</b>	11,63
	320	65	4	1,5	131	317	380	1600	2000	<b>7330 BM</b>	26,53
	320	65	4	1,5	131	317	380	1600	2000	<b>7330 BMP5</b>	26,53
<b>160</b>	220	28	2	1	58	110	134	2200	3000	<b>71932 AMAP5</b>	3,263
<b>180</b>	250	33	2	2	33	131	162	2000	2800	<b>71936 AM</b>	5,36
<b>200</b>	250	30	1,5	0,6	45	102	141	3000	5600	<b>72840 CMAP4</b>	3,43

**Angular contact ball bearings, single row,  
for paired and stack mounted**



Dimensions						Basic radial load dyn. C <sub>r</sub>	Speed limit	Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a				
						kN	min <sup>-1</sup>	-	Kg
<b>15</b>	35	11	0,6	0,3	16	12	7,8	14000 20000	<b>7202 BDT</b> 0,096
	35	11	0,6	0,3	16	12	7,8	13000 18000	<b>7202 BDB</b> 0,096
	35	11	0,6	0,3	16	12	7,8	14000 20000	<b>7202 BP6DT</b> 0,096
	35	11	0,6	0,3	16	12	7,8	13000 18000	<b>7202 BP5DB</b> 0,096
<b>17</b>	40	12	0,6	0,6	18	17,8	12,2	13000 17000	<b>7203 BDT</b> 0,140
	40	12	0,6	0,6	18	17,8	12,2	11000 15000	<b>7203 BDB</b> 0,140
	40	12	0,6	0,6	18	17,8	12,2	11000 15000	<b>7203 BDF</b> 0,140
	40	12	0,6	0,6	18	17,8	12,2	11000 15000	<b>7203 BP6DB</b> 0,140
	40	12	0,6	0,6	18	17,8	12,2	11000 15000	<b>7203 BP5DB</b> 0,140
	47	14	1	0,6	21	24	16,2	11000 15000	<b>7303 BDT</b> 0,240
<b>20</b>	47	14	1	0,6	21	22,8	16,8	10000 14000	<b>7204 BDT</b> 0,220
	47	14	1	0,6	21	22,8	16,8	10000 14000	<b>7204 BDB</b> 0,220
	47	14	1	0,6	21	22,8	16,8	9000 13000	<b>7204 BDF</b> 0,220
	47	14	1	0,6	21	22,8	16,8	9000 13000	<b>7204 BP6DB</b> 0,220
	47	14	1	0,6	21	22,8	16,8	9000 13000	<b>7204 BP5DB</b> 0,220
	52	15	1,1	0,6	23	28	19,4	9000 14000	<b>7304 BDT</b> 0,303
	52	15	1,1	0,6	23	28	19,4	8000 12000	<b>7304 BDB</b> 0,303
	52	15	1,1	0,6	23	28	19,4	8000 12000	<b>7304 BDF</b> 0,303
<b>25</b>	52	15	1	0,6	24	25,1	20,2	9000 13000	<b>7205 BDT</b> 0,260
	52	15	1	0,6	24	25,1	20,2	7500 11000	<b>7205 BDB</b> 0,260
	52	15	1	0,6	24	25,1	20,2	7500 11000	<b>7205 BDF</b> 0,260
	52	15	1	0,6	24	25,1	20,2	7500 11000	<b>7205 BP6DB</b> 0,260
	52	15	1	0,6	24	25,1	20,2	9000 13000	<b>7205 BP5DT</b> 0,260
	52	15	1	0,6	24	33,5	30,3	7000 10000	<b>7205 BP5TFT</b> 0,390
	62	17	1,1	0,6	27	39,5	29,2	7500 11000	<b>7305 BDT</b> 0,500
	62	17	1,1	0,6	27	39,5	29,2	6700 9500	<b>7305 BDB</b> 0,500
	62	17	1,1	0,6	27	39,5	29,2	6700 9500	<b>7305 BDF</b> 0,500
	62	17	1,1	0,6	27	39,5	29,2	6700 9500	<b>7305 AMADF</b> 0,500
<b>30</b>	62	16	1	0,6	27	33,2	27,2	7500 11000	<b>7206 BDT</b> 0,420
	62	16	1	0,6	27	33,2	27,2	6700 9500	<b>7206 BDB</b> 0,420
	62	16	1	0,6	27	33,2	27,2	6700 9500	<b>7206 BDF</b> 0,420
	62	16	1	0,6	27	33,2	27,2	6700 9500	<b>7206 BP6DB</b> 0,420
	62	16	1	0,6	27	33,2	27,2	6700 9500	<b>7206 BP5DB</b> 0,420
	62	16	1	0,6	27	44,3	40,8	6000 8500	<b>7206 BP5TFT</b> 0,630
	62	16	1	0,6	27	33,2	27,2	7500 11000	<b>7206 ATAP2DT</b> 0,420
	72	19	1,1	0,6	31	47,5	38	6700 9000	<b>7306 BDT</b> 0,740
	72	19	1,1	0,6	31	47,5	38	6000 8000	<b>7306 BDB</b> 0,740
	72	19	1,1	0,6	31	47,5	38	6000 8000	<b>7306 BDF</b> 0,740
	72	19	1,1	0,6	31	63,3	57	5300 7000	<b>7306 BTFT</b> 1,113
	72	19	1,1	0,6	31	77,4	76	5300 7000	<b>7306 BQFC</b> 1,483

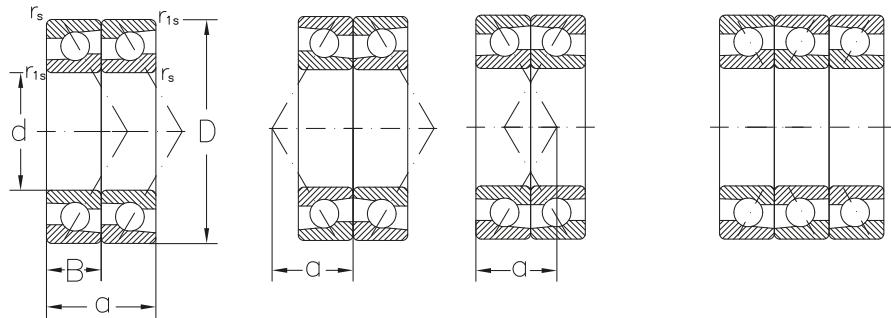
## Angular contact ball bearings, single row, for paired and stack mounted



DF TFT

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
						kN		min <sup>-1</sup>		-	Kg
<b>30</b>	72	19	1,1	0,6	31	47,5	38	6700	9000	<b>7306 BP5DT</b>	0,740
	72	19	1,1	0,6	31	47,5	38	6700	9000	<b>7306 AMADT</b>	0,740
	72	19	1,1	0,6	31	47,5	38	6700	8000	<b>7306 AMADF</b>	0,740
<b>35</b>	72	17	1,1	0,6	31	46,2	39,6	6700	9000	<b>7207 BDT</b>	0,600
	72	17	1,1	0,6	31	46,2	39,6	6000	8000	<b>7207 BDB</b>	0,600
	72	17	1,1	0,6	31	46,2	39,6	6000	8000	<b>7207 BDF</b>	0,600
	72	17	1,1	0,6	31	46,2	39,6	6700	9000	<b>7207 BP5DT</b>	0,600
	72	17	1,1	0,6	31	46,2	39,6	6000	8000	<b>7207 BP5DB</b>	0,600
	72	17	1,1	0,6	31	61,6	59,4	5300	7000	<b>7207 BP5TBT</b>	0,900
	72	17	1,1	0,6	31	75,2	79,2	5300	7000	<b>7207 BP5QFC</b>	1,203
	80	21	1,5	1	35	59,5	48,6	6300	8500	<b>7307 BDT</b>	1,023
	80	21	1,5	1	35	59,5	48,6	5600	7500	<b>7307 BDB</b>	1,023
	80	21	1,5	1	35	59,5	48,6	5600	7500	<b>7307 BDF</b>	1,023
	80	21	1,5	1	35	59,5	48,6	5600	7500	<b>7307 BP6DB</b>	1,023
<b>40</b>	80	18	1,1	0,6	34	52	46	6000	8000	<b>7208 BDT</b>	0,780
	80	18	1,1	0,6	34	52	46	6030	8100	<b>7208 BDB</b>	0,780
	80	18	1,1	0,6	34	52	46	5300	7000	<b>7208 BDF</b>	0,780
	80	18	1,1	0,6	34	52	46	6000	8000	<b>7208 BP5DT</b>	0,780
	80	18	1,1	0,6	34	52	46	5300	7000	<b>7208 BP5DB</b>	0,780
	90	23	1,5	1	39	72,6	60,6	5600	7500	<b>7308 BDT</b>	1,343
	90	23	1,5	1	39	72,6	60,6	5000	6700	<b>7308 BDB</b>	1,343
	90	23	1,5	1	39	72,6	60,6	5000	6700	<b>7308 BDF</b>	1,343
	90	23	1,5	1	39	96,8	91,8	4500	6000	<b>7308 BTFT</b>	0,670
	90	23	1,5	1	39	118	121	4500	6000	<b>7308 BQFC</b>	2,683
	90	23	1,5	1	39	72,6	60,6	5000	6700	<b>7308 BP6DF</b>	1,343
	90	23	1,5	1	39	72,6	60,6	5000	6700	<b>7308 BP5DB</b>	1,343
	90	23	1,5	1	39	96,8	91,8	4500	6000	<b>7308 BP5TFT</b>	2,013
	90	23	1,5	1	39	118	121	4500	6000	<b>7308 BP5QFC</b>	2,683
<b>45</b>	85	19	1,1	0,6	37	58,5	52,4	5600	7500	<b>7209 BDT</b>	0,880
	85	19	1,1	0,6	37	58,5	52,4	5000	6700	<b>7209 BDB</b>	0,880
	85	19	1,1	0,6	37	58,5	52,4	5000	6700	<b>7209 BDF</b>	0,880
	85	19	1,1	0,6	37	58,5	52,4	5000	6700	<b>7209 BP5DB</b>	0,880
	100	25	1,5	1	43	94,4	80,2	5000	6700	<b>7309 BDT</b>	1,803
	100	25	1,5	1	43	94,4	80,2	4500	6000	<b>7309 BDB</b>	1,803
	100	25	1,5	1	43	94,4	80,2	4480	6000	<b>7309 BDF</b>	1,803
	100	25	1,5	1	43	94,4	80,2	4500	6000	<b>7309 BP6DB</b>	1,803
<b>50</b>	100	25	1,5	1	43	94,4	80,2	4500	6000	<b>7309 BP6DF</b>	1,803
	90	20	1,1	0,6	39	60,6	57,2	5000	6700	<b>7210 BDT</b>	0,980
	90	20	1,1	0,6	39	60,6	57,2	4500	6000	<b>7210 BDF</b>	0,980
	90	20	1,1	0,6	39	60,6	57,2	5000	6700	<b>7210 BP5DT</b>	0,980
	110	27	2	1	47	111	95,8	4500	6000	<b>7310 BDT</b>	2,303

**Angular contact ball bearings, single row,  
for paired and stack mounted**



DT

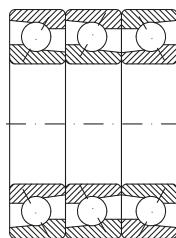
DB

DF

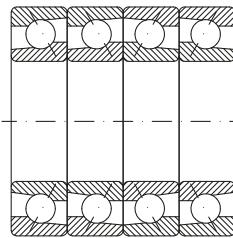
TFT

Dimensions						Basic radial load	Speed limit		Designation	Mass	
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil		
						kN	min <sup>-1</sup>		-	Kg	
<b>50</b>	110	27	2	1	47	111	95,8	4000	5300	<b>7310 BDB</b>	2,303
	110	27	2	1	47	111	95,8	4000	5300	<b>7310 BDF</b>	2,303
	110	27	2	1	47	205	144	3600	4800	<b>7310 BP5TFT</b>	3,453
	110	27	2	1	47	273	192	3600	4800	<b>7310 BP5QFC</b>	4,603
<b>55</b>	100	21	1,5	1	43	74,8	72,4	4800	6300	<b>7211 BDT</b>	1,303
	100	21	1,5	1	43	74,8	72,4	4300	5600	<b>7211 BDB</b>	1,303
	100	21	1,5	1	43	74,8	72,4	4300	5600	<b>7211 BDF</b>	1,303
	120	29	2	1	51	128	113	4000	5300	<b>7311 BDT</b>	2,903
	120	29	2	1	51	128	113	3600	4800	<b>7311 BDB</b>	2,903
	120	29	2	1	52	128	113	3600	4800	<b>7311 BDF</b>	2,903
<b>60</b>	110	22	1,5	1	47	91,2	89,4	4300	5600	<b>7212 BDT</b>	1,683
	110	22	1,5	1	47	91,2	89,4	3800	5000	<b>7212 BDB</b>	1,683
	110	22	1,5	1	47	91,2	89,4	3800	5000	<b>7212 BDF</b>	1,683
	110	22	1,5	1	47	91,2	89,4	3800	5000	<b>7212 BP5DB</b>	1,683
	130	31	2,1	1,1	55	146	131	3800	5000	<b>7312 BDT</b>	3,703
	130	31	2,1	1,1	55	146	131	3400	4500	<b>7312 BDB</b>	3,703
	130	31	2,1	1,1	55	146	131	3400	4500	<b>7312 BDF</b>	3,703
	130	31	2,1	1,1	55	146	131	3400	4500	<b>7312 BP5DB</b>	3,703
<b>65</b>	120	23	1,5	1	50	103	105	3800	5000	<b>7213 BDT</b>	2,103
	120	23	1,5	1,1	50	103	105	3800	5000	<b>7213 BDB</b>	2,103
	120	23	1,5	1,1	50	103	105	3800	5000	<b>7213 BDF</b>	2,103
	120	23	1,5	1	50	103	105	3400	4500	<b>7213 BP6DB</b>	2,103
	120	23	1,5	1	50	103	105	3400	4500	<b>7213 BP6DF</b>	2,103
	140	33	2,1	1,1	60	164	151	3600	4800	<b>7313 BDT</b>	4,503
	140	33	2,1	1,1	60	164	151	3200	4300	<b>7313 BDB</b>	4,503
	140	33	2,1	1,1	60	164	151	3200	4300	<b>7313 BDF</b>	4,503
<b>70</b>	125	24	1,5	1	53	112	116	3800	5000	<b>7214 BDT</b>	2,303
	125	24	1,5	1	53	112	116	3400	4500	<b>7214 BDB</b>	2,303
	125	24	1,5	1	53	112	116	3400	4500	<b>7214 BDF</b>	2,303
	150	35	2,1	1,1	64	185	172	3400	4500	<b>7314 BDT</b>	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	<b>7314 BDB</b>	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	<b>7314 BDF</b>	5,503
	150	35	2,1	1,1	64	185	172	3400	4500	<b>7314 BP6DT</b>	5,503
	150	35	2,1	1,1	64	185	172	3400	4500	<b>7314 BP5DT</b>	5,503
	150	35	2,1	1,1	64	185	172	3000	4000	<b>7314 BP5DB</b>	5,503
<b>75</b>	130	25	1,5	1	56	121	126	3600	4300	<b>7215 BDT</b>	2,603
	130	25	1,5	1	56	121	126	3200	4300	<b>7215 BDB</b>	2,603
	130	25	1,5	1	56	121	126	3200	4300	<b>7215 BDF</b>	2,603
	130	25	1,5	1	56	121	126	3200	4300	<b>7215 BP6DB</b>	2,603
	130	25	1,5	1	56	121	126	3200	4300	<b>7215 BMAP6DB</b>	2,603
	160	37	2,1	1,1	68	203	195	3200	4000	<b>7315 BDT</b>	6,603
	160	37	2,1	1,1	68	203	195	2800	3600	<b>7315 BDB</b>	6,603

## Angular contact ball bearings, single row, for paired and stack mounted



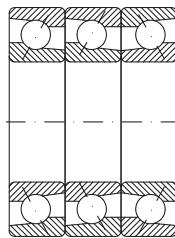
TBT



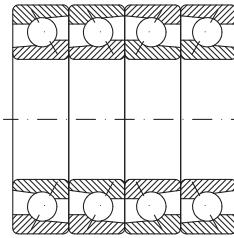
QFC

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
mm						kN		min <sup>-1</sup>		-	
<b>75</b>	160	37	2,1	1,1	68	203	195	2800	3600	<b>7315 BDF</b>	6,603
	160	37	2,1	1,1	68	203	195	2800	3600	<b>7315 AMADF</b>	6,603
<b>80</b>	110	16	1	1	21	55,1	69,2	4000	5300	<b>71916 CTAP4DT</b>	0,736
	140	26	2	1	59	130	139	3200	4300	<b>7216 BDT</b>	3,103
	140	26	2	1	59	130	139	2800	3800	<b>7216 BDB</b>	3,103
	140	26	2	1	59	130	139	2800	3800	<b>7216 BDF</b>	3,103
	170	39	2,1	1,1	72	219	218	2800	3800	<b>7316 BDT</b>	7,803
	170	39	2,1	1,1	72	219	218	2600	3400	<b>7316 BDB</b>	7,803
	170	39	2,1	1,1	72	219	218	2600	3400	<b>7316 BDF</b>	7,803
	170	39	2,1	1,1	72	292	327	2200	3000	<b>7316 BTBT</b>	11,73
	170	39	2,1	1,1	72	219	218	2800	3800	<b>7316 BP6DT</b>	7,803
	170	39	2,1	1,1	72	292	327	2200	3000	<b>7316 BMAP6TBT</b>	11,73
<b>85</b>	150	28	2	1	64	151	162	3000	4000	<b>7217 BDT</b>	3,903
	150	28	2	1	64	151	162	2800	3600	<b>7217 BDB</b>	3,903
	150	28	2	1	64	151	162	2800	3600	<b>7217 BDF</b>	3,903
	180	41	3	1,1	76	235	244	2800	3600	<b>7317 BDT</b>	9,203
	180	41	3	1,1	76	235	244	2400	3200	<b>7317 BDB</b>	9,203
	180	41	3	1,1	76	235	244	2400	3200	<b>7317 BDF</b>	9,203
<b>90</b>	160	30	2	1	67	173	188	2800	3800	<b>7218 BDT</b>	4,803
	160	30	2	1	67	173	188	2600	3400	<b>7218 BDB</b>	4,803
	160	30	2	1	67	173	188	2600	3400	<b>7218 BDF</b>	4,803
	190	43	3	1,1	80	253	270	2600	3400	<b>7318 BDT</b>	10,83
	190	43	3	1,1	80	253	270	2200	3000	<b>7318 BDB</b>	10,83
	190	43	3	1,1	80	253	270	2200	3000	<b>7318 BDF</b>	10,83
	190	43	3	1,1	80	337	405	2000	2600	<b>7318 BTBT</b>	16,23
<b>95</b>	170	32	2,1	1,1	72	188	202	2800	3600	<b>7219 BDT</b>	5,803
	170	32	2,1	1,1	72	188	202	2400	3200	<b>7219 BDB</b>	5,803
	170	32	2,1	1,1	72	188	202	2400	3200	<b>7219 BDF</b>	5,803
	200	45	3	1,1	84	272	300	2400	3200	<b>7319 BDT</b>	12,53
	200	45	3	1,1	84	272	300	2000	2800	<b>7319 BDB</b>	12,53
	200	45	3	1,1	84	272	300	2000	2800	<b>7319 BDF</b>	12,53
<b>100</b>	180	34	2,1	1,1	76	208	232	2600	3400	<b>7220 BDT</b>	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	<b>7220 BDB</b>	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	<b>7220 BDF</b>	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	<b>7220 BMADB</b>	6,903
	180	34	2,1	1,1	76	208	232	2200	3000	<b>7220 BMAP6DB</b>	6,903
	180	34	2,1	1,1	76	208	232	2600	3200	<b>7220 BMAP4DT</b>	6,903
	215	47	3	1,1	90	308	356	2200	3000	<b>7320 BDT</b>	15,53
	215	47	3	1,1	90	308	356	1900	2800	<b>7320 BDB</b>	15,53
	215	47	3	1,1	90	308	356	1900	2800	<b>7320 BDF</b>	15,53
	215	47	3	1,1	90	308	356	2200	3000	<b>7320 BP6DT</b>	15,53

**Angular contact ball bearings, single row,  
for paired and stack mounted**



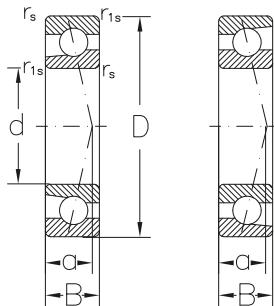
TBT



QFC

Dimensions						Basic radial load	Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil	
						kN			-	Kg
<b>100</b>	215	47	3	1,1	90	308	356	2200	3000	<b>7320 BMDT</b> 15,53
<b>110</b>	200	38	2,1	1,1	84	248	290	2200	3000	<b>7222 BDT</b> 9,603
	200	38	2,1	1,1	84	248	290	1900	2800	<b>7222 BDB</b> 9,603
	240	50	3	1,1	99	365	458	1800	2800	<b>7322 BDT</b> 21,03
	240	50	3	1,1	99	365	458	1600	2400	<b>7322 BDB</b> 21,03
	240	50	3	1,1	99	536	687	1400	2200	<b>7322 BTBT</b> 31,53
	240	50	3	1,1	99	365	458	1800	2800	<b>7322 BP5DT</b> 21,03
	240	50	3	1,1	99	365	458	1600	2400	<b>7322 BMDF</b> 21,03
<b>140</b>	250	42	3	1,1	103	172	189	1400	1900	<b>7228 BDT</b> 17,63
	300	62	4	1,5	123	470	668	1400	2200	<b>7328 BDT</b> 43,23
	300	62	4	1,5	123	470	668	1200	1900	<b>7328 BDB</b> 43,23
	300	62	4	1,5	123	470	668	1400	2200	<b>7328 BMBP5DT</b> 43,23
<b>150</b>	270	45	3	1,1	111	156	444	2400	3800	<b>7230 BDB</b> 23,23
	270	45	3	1,1	111	156	444	2400	3800	<b>7230 BMDB</b> 23,23
	320	65	4	1,5	131	254	760	1400	1800	<b>7330 BMDF</b> 53,03
	320	65	4	1,5	131	254	760	1400	1800	<b>7330 BMP5DT</b> 53,03
<b>160</b>	220	28	2	1	58	176	268	1600	2400	<b>71932 AMAP5DB</b> 6,523
<b>180</b>	250	33	2	2	33	210	324	1500	2200	<b>71936 AMDB</b> 10,83
<b>200</b>	250	30	1,5	0,6	45	165	282	1400	2000	<b>72840 CMAP4DB</b> 6,863
	250	30	1,5	0,6	45	220	423	1300	1800	<b>72840 CMAP4TBT</b> 10,23

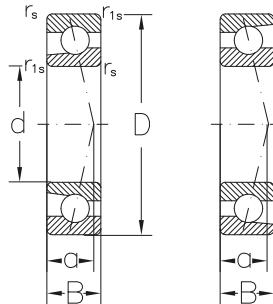
## High precision angular contact ball bearings single row



TA                    TB

Dimensions	d	D	B	$r_s$ min.	$r_{1s}$ min.	a	Basic radial load		Speed limit		Designation	Mass
							dyn. $C_r$	stat. $C_{0r}$	grease	oil		
							kN	min <sup>-1</sup>	-	Kg		
mm												
<b>10</b>	26	8	0,3	0,1	6	5,3	2,45	56000	90000	<b>7000 CTAP4</b>	0,020	
	26	8	0,3	0,1	6	5,3	2,45	56000	90000	<b>7000 CTAP2</b>	0,020	
	30	9	0,6	0,3	7	5,8	2,95	50000	80000	<b>7200 CTAP4</b>	0,029	
	30	9	0,6	0,3	7	9,4	2,95	50000	80000	<b>7200 CTAP2</b>	0,029	
<b>12</b>	28	8	0,3	0,1	7	5,4	2,6	50000	80000	<b>7001 CTAP4</b>	0,023	
	28	8	0,3	0,1	7	5,4	2,6	50000	80000	<b>7001 CTAP2</b>	0,023	
	32	10	0,6	0,3	10	7,5	3,4	45000	70000	<b>7201 CTAP4</b>	0,030	
	32	10	0,6	0,3	10	7,5	3,4	45000	70000	<b>7201 CTAP2</b>	0,030	
<b>15</b>	32	9	0,3	0,1	8	6,3	3,4	43000	67000	<b>7002 CTAP4</b>	0,030	
	32	9	0,3	0,1	8	6,3	3,4	43000	67000	<b>7002 CTAP2</b>	0,030	
	35	11	0,6	0,3	9	8,9	4,5	40000	63000	<b>7202 CTAP4</b>	0,042	
	35	11	0,6	0,3	9	8,9	4,5	40000	63000	<b>7202 CTAP2</b>	0,042	
	35	11	0,6	0,3	12	8,7	4,4	36000	56000	<b>7202 ATAP4</b>	0,042	
	35	11	0,6	0,3	12	8,7	4,4	36000	56000	<b>7202 ATAP2</b>	0,042	
<b>17</b>	35	10	0,3	0,1	9	7,2	4,2	38000	60000	<b>7003 CTAP4</b>	0,039	
	35	10	0,3	0,1	9	7,2	4,2	38000	60000	<b>7003 CTAP2</b>	0,039	
	40	12	0,6	0,3	10	10,9	5,8	36000	56000	<b>7003 CTAP4</b>	0,060	
	40	12	0,6	0,3	10	10,9	5,8	36000	56000	<b>7203 CTAP2</b>	0,060	
	40	12	0,6	0,3	13	9	5,1	30000	48000	<b>7203 ATAP4</b>	0,060	
	40	12	0,6	0,3	13	9	5,1	30000	48000	<b>7203 ATAP2</b>	0,060	
<b>20</b>	42	12	0,6	0,3	10	10,5	6,1	32000	50000	<b>7004 CTAP4</b>	0,070	
	42	12	0,6	0,3	10	10,5	6,1	32000	50000	<b>7004 CTAP2</b>	0,070	
	42	12	0,6	0,3	10	10,5	6,1	32000	50000	<b>7004 CTBP4</b>	0,070	
	42	12	0,6	0,3	10	10,5	6,1	32000	50000	<b>7004 CTBP2</b>	0,070	
	42	12	0,6	0,3	13	10	5,8	28000	45000	<b>7004 ATAP4</b>	0,070	
	42	12	0,6	0,3	13	10	5,8	28000	45000	<b>7004 ATAP2</b>	0,070	
	47	14	1	0,6	12	15,6	9	30000	48000	<b>7204 CTAP4</b>	0,100	
	47	14	1	0,6	12	15,6	9	30000	48000	<b>7204 CTAP2</b>	0,100	
	47	14	1	0,6	12	15,6	9	30000	48000	<b>7204 CTBP4</b>	0,100	
	47	14	1	0,6	12	15,6	9	30000	48000	<b>7204 CTBP2</b>	0,100	
	47	14	1	0,6	15	14,9	8,6	26000	43000	<b>7204 ATAP4</b>	0,100	
	47	14	1	0,6	15	14,9	8,6	26000	43000	<b>7204 ATAP2</b>	0,100	
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	<b>7005 CTAP4</b>	0,080	
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	<b>7005 CTAP2</b>	0,080	
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	<b>7005 CTBP4</b>	0,080	
	47	12	0,6	0,3	11	11,7	7,4	28000	45000	<b>7005 CTBP2</b>	0,080	
	47	12	0,6	0,3	15	10,4	6,95	24000	40000	<b>7005 ATAP4</b>	0,080	
	47	12	0,6	0,3	15	10,4	6,95	24000	40000	<b>7005 ATAP2</b>	0,080	
	52	15	1	0,6	13	16,6	10,3	26000	43000	<b>7205 CTAP4</b>	0,120	
	52	15	1	0,6	13	16,6	10,3	26000	43000	<b>7205 CTAP2</b>	0,120	
	52	15	1	0,6	13	16,6	10,3	26000	43000	<b>7205 CTBP4</b>	0,120	
	52	15	1	0,6	13	16,6	10,3	26000	43000	<b>7205 CTBP2</b>	0,120	

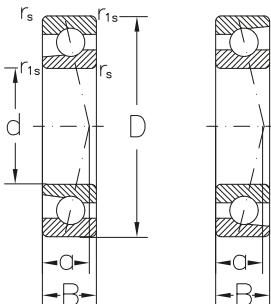
## High precision angular contact ball bearings single row



TA                    TB

Dimensions						Basic radial load dyn. C <sub>r</sub>	Speed limit stat. C <sub>0r</sub>	Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a				
						kN	min <sup>-1</sup>	-	Kg
<b>25</b>	52	15	1	0,6	17	13,7	8,8	22000	38000
	52	15	1	0,6	17	13,7	8,8	22000	38000
<b>30</b>	55	13	1	0,3	12	15,1	10,3	24000	40000
	55	13	1	0,3	12	15,1	10,3	24000	40000
	55	13	1	0,3	12	15,1	10,3	24000	40000
	55	13	1	0,3	12	15,1	10,3	24000	40000
	55	13	1	0,3	17	13,4	9,5	20000	36000
	55	13	1	0,3	17	13,4	9,5	20000	36000
	62	16	1	0,6	14	23	14,8	22000	38000
	62	16	1	0,6	14	23	14,8	22000	38000
	62	16	1	0,6	14	23	14,8	22000	38000
	62	16	1	0,6	14	23	14,8	22000	38000
	62	16	1	0,6	19	22	14,1	19000	34000
	62	16	1	0,6	19	22	14,1	19000	34000
<b>35</b>	62	14	1	0,3	14	19,2	13,7	20000	36000
	62	14	1	0,3	14	19,2	13,7	20000	36000
	62	14	1	0,3	14	19,2	13,7	20000	36000
	62	14	1	0,3	14	19,2	13,7	20000	36000
	62	14	1	0,3	19	18,2	13,1	18000	32000
	62	14	1	0,3	19	18,2	13,1	18000	32000
	62	14	1	0,3	19	18,2	13,1	18000	32000
	62	14	1	0,3	19	18,2	13,1	18000	32000
	72	17	1,1	0,6	16	30,4	20,2	19000	34000
	72	17	1,1	0,6	16	30,4	20,2	19000	34000
	72	17	1,1	0,6	16	30,4	20,2	19000	34000
	72	17	1,1	0,6	16	30,4	20,2	19000	34000
	72	17	1,1	0,6	21	24,5	17	16000	28000
	72	17	1,1	0,6	21	24,5	17	16000	28000
<b>40</b>	68	15	1	0,3	15	20,6	15,9	19000	34000
	68	15	1	0,3	15	20,6	15,9	19000	34000
	68	15	1	0,3	20	19,5	15	16000	28000
	68	15	1	0,3	20	19,5	15	16000	28000
	68	15	1	0,3	20	19,5	15	16000	28000
	80	18	1,1	0,6	17	36,3	25,2	17000	30000
	80	18	1,1	0,6	17	36,3	25,2	17000	30000
	80	18	1,1	0,6	17	36,3	25,2	17000	30000
	80	18	1,1	0,6	17	36,3	25,2	17000	30000
	80	18	1,1	0,6	23	35,2	24,4	15000	26000
	80	18	1,1	0,6	23	35,2	24,4	15000	26000
	80	18	1,1	0,6	23	35,2	24,4	15000	26000
<b>45</b>	75	16	1	0,3	16	24,4	19,3	16000	28000
	75	16	1	0,3	16	24,4	19,3	15000	28000
	75	16	1	0,3	22	22	17,3	15000	26000
	75	16	1	0,3	22	22	17,3	15000	26000

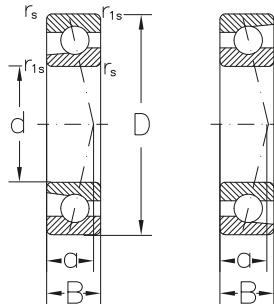
## High precision angular contact ball bearings single row



TA                    TB

Dimensions	d	D	B	$r_s$ min.	$r_{1s}$ min.	a	Basic radial load		Speed limit		Designation	Mass
							dyn. $C_r$	stat. $C_{0r}$	grease	oil		
							kN	min <sup>-1</sup>	-	Kg		
mm												
<b>45</b>	75	16	1	0,3	22	22	17,3	15000	26000	<b>7009 ATAP2</b>	0,250	
	85	19	1,1	0,6	18	40	29	15000	26000	<b>7209 CTAP4</b>	0,400	
	85	19	1,1	0,6	18	40	29	15000	26000	<b>7209 CTAP2</b>	0,400	
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	<b>7209 ATAP4</b>	0,400	
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	<b>7209 ATAP2</b>	0,400	
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	<b>7209 ATBP4</b>	0,400	
	85	19	1,1	0,6	25	36,8	27,5	13000	22000	<b>7209 ATBP2</b>	0,400	
<b>50</b>	80	16	1	0,3	17	25,1	20,7	15000	26000	<b>7010 CTAP4</b>	0,260	
	80	16	1	0,3	17	25,1	20,7	15000	26000	<b>7010 CTAP2</b>	0,260	
	80	16	1	0,3	23	23,2	20	13000	22000	<b>7010 ATAP4</b>	0,260	
	80	16	1	0,3	23	23,2	20	13000	22000	<b>7010 ATAP2</b>	0,260	
	90	20	1,1	0,6	20	42,8	31,7	14000	24000	<b>7210 CTAP4</b>	0,450	
	90	20	1,1	0,6	20	42,8	31,7	14000	24000	<b>7210 CTAP2</b>	0,450	
	90	20	1,1	0,6	27	42	31	12000	20000	<b>7210 ATAP4</b>	0,450	
	90	20	1,1	0,6	27	42	31	12000	20000	<b>7210 ATAP2</b>	0,450	
	90	20	1,1	0,6	27	42	31	12000	20000	<b>7210 ATBP4</b>	0,450	
	90	20	1,1	0,6	27	42	31	12000	20000	<b>7210 ATBP2</b>	0,450	
<b>55</b>	90	18	1,1	0,6	19	34,1	28,6	13000	22000	<b>7011 CTAP4</b>	0,390	
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	<b>7011 CTAP2</b>	0,390	
	90	18	1,1	0,6	19	34,1	28,6	13000	22000	<b>7011 CTBP4</b>	0,390	
	90	18	1,1	0,6	26	32,3	27,1	12000	20000	<b>7011 ATAP4</b>	0,390	
	90	18	1,1	0,6	26	32,3	27,1	12000	20000	<b>7011 ATAP2</b>	0,390	
	100	21	1,5	1	21	53	40	12000	20000	<b>7211 CTAP4</b>	0,600	
	100	21	1,5	1	21	53	40	12000	20000	<b>7211 CTAP2</b>	0,600	
	100	21	1,5	1	29	50,6	38,3	11000	19000	<b>7211 ATAP4</b>	0,600	
	100	21	1,5	1	29	50,6	38,3	11000	19000	<b>7211 ATAP2</b>	0,600	
	100	21	1,5	1	29	50,6	38,3	11000	19000	<b>7211 ATBP4</b>	0,600	
	100	21	1,5	1	29	50,6	38,3	11000	19000	<b>7211 ATBP2</b>	0,600	
<b>60</b>	95	18	1,1	0,6	20	35	30,5	12000	20000	<b>7012 CTAP4</b>	0,420	
	95	18	1,1	0,6	20	35	30,5	12000	20000	<b>7012 CTAP2</b>	0,420	
	95	18	1,1	0,6	20	35	30,5	12000	20000	<b>7012 CTBP2</b>	0,420	
	95	18	1,1	0,6	27	33,2	29,1	11000	19000	<b>7012 ATAP4</b>	0,420	
	95	18	1,1	0,6	27	33,2	29,1	11000	19000	<b>7012 ATAP2</b>	0,420	
	110	22	1,5	1	23	64,2	49	11000	19000	<b>7212 CTAP4</b>	0,770	
	110	22	1,5	1	23	64	49	11000	19000	<b>7212 CTAP2</b>	0,770	
	110	22	1,5	1	31	61	47,5	9500	17000	<b>7212 ATAP4</b>	0,770	
	110	22	1,5	1	31	61	47,5	9500	17000	<b>7212 ATAP2</b>	0,770	
	110	22	1,5	1	31	61	47,5	9500	17000	<b>7212 ATBP4</b>	0,770	
	110	22	1,5	1	31	61	47,5	9500	17000	<b>7212 ATBP2</b>	0,770	
<b>65</b>	100	18	1,1	0,6	20	36	32,5	12000	20000	<b>7013 CTAP4</b>	0,460	
	100	18	1,1	0,6	20	36	32,5	12000	20000	<b>7013 CTAP2</b>	0,460	
	100	18	1,1	0,6	28	34	31	10000	18000	<b>7013 AMBP4</b>	0,460	

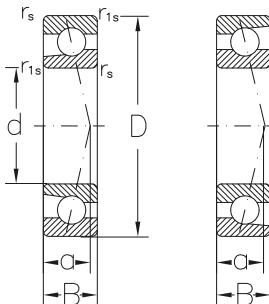
## High precision angular contact ball bearings single row



TA                    TB

Dimensions						Basic radial load dyn. $C_r$	Speed limit		Designation	Mass	
d	D	B	$r_s$ min.	$r_{1s}$ min.	a		stat. $C_{0r}$	grease			
mm											
<b>65</b>	100	18	1,1	0,6	28	34	31	10000	18000	<b>7013 ATAP4</b>	0,460
	100	18	1,1	0,6	28	34	31	10000	18000	<b>7013 ATAP2</b>	0,460
	100	18	1,1	0,6	28	34	31	10000	18000	<b>7013 ATBP4</b>	0,460
	120	23	1,5	1	24	72	57	10000	18000	<b>7213 CTAP4</b>	0,970
	120	23	1,5	1	24	72	57	10000	18000	<b>7213 CTAP2</b>	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	<b>7213 ATAP4</b>	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	<b>7213 ATAP2</b>	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	<b>7213 ATBP4</b>	0,970
	120	23	1,5	1	33	69,5	54	9000	16000	<b>7213 ATBP2</b>	0,970
<b>70</b>	110	20	1,1	0,6	22	45,3	40,8	10000	18000	<b>7014 CTAP4</b>	0,640
	110	20	1,1	0,6	22	45,3	40,8	10000	18000	<b>7014 CTAP2</b>	0,640
	110	20	1,1	0,6	22	45,3	40,8	10000	18000	<b>7014 CTBP4</b>	0,640
	110	20	1,1	0,6	31	43	34	9000	16000	<b>7014 ATAP4</b>	0,640
	110	20	1,1	0,6	31	43	34	9000	16000	<b>7014 ATAP2</b>	0,640
	125	24	1,5	1	25	76	60,2	95000	17000	<b>7214 CTAP4</b>	1,053
	125	24	1,5	1	25	76	60,2	95000	17000	<b>7214 CTAP2</b>	1,053
	125	24	1,5	1	35	78	57	8500	15000	<b>7214 ATAP4</b>	1,053
	125	24	1,5	1	35	78	57	8500	15000	<b>7214 ATAP2</b>	1,053
	125	24	1,5	1	35	78	57	8500	15000	<b>7214 ATBP4</b>	1,053
	125	24	1,5	1	35	78	57	8500	15000	<b>7214 ATBP2</b>	1,053
<b>75</b>	115	20	1,1	0,6	23	46,5	43,5	10000	18000	<b>7015 CTAP4</b>	0,680
	115	20	1,1	0,6	23	46,5	43,5	10000	18000	<b>7015 CTAP2</b>	0,680
	115	20	1,1	0,6	32	44	41,2	8500	15000	<b>7015 ATAP4</b>	0,680
	115	20	1,1	0,6	32	44	41,2	8500	15000	<b>7015 ATAP2</b>	0,680
	115	20	1,1	0,6	32	44	41,2	8500	15000	<b>7015 ATBP2</b>	0,680
	130	25	1,5	1	26	80	65,5	9000	16000	<b>7215 CTAP4</b>	1,153
	130	25	1,5	1	26	80	65,5	9000	16000	<b>7215 CTAP2</b>	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	<b>7215 ATAP4</b>	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	<b>7215 ATAP2</b>	1,153
	130	25	1,5	1	37	73	60,5	8000	14000	<b>7215 ATBP4</b>	1,153
<b>80</b>	125	22	1,1	0,6	25	58,6	55	9000	16000	<b>7016 CTAP4</b>	0,890
	125	22	1,1	0,6	25	58,7	55,2	9000	16000	<b>7016 CTAP2</b>	0,890
	125	22	1,1	0,6	35	56	63	8000	14000	<b>7016 AMAP4</b>	0,890
	125	22	1,1	0,6	35	56,2	63	8000	14000	<b>7016 ATAP4</b>	0,890
	125	22	1,1	0,6	35	56	63	8000	14000	<b>7016 ATAP2</b>	0,890
	140	26	2	1	28	92,6	78	7500	13000	<b>7216 CTAP4</b>	1,403
	140	26	2	1	28	93,2	78	8000	14000	<b>7216 CTAP2</b>	1,403
	140	26	2	1	39	86	73,5	7000	12000	<b>7216 ATAP4</b>	1,403
	140	26	2	1	39	86	73,5	7000	12000	<b>7216 ATAP2</b>	1,403
	140	26	2	1	39	86	73,5	7000	12000	<b>7216 ATBP4</b>	1,403
	140	26	2	1	39	86	73,5	7000	12000	<b>7216 ATBP2</b>	1,403

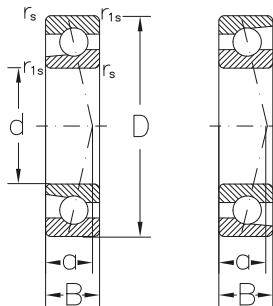
## High precision angular contact ball bearings single row



TA                    TB

Dimensions	d	D	B	$r_s$ min.	$r_{1s}$ min.	a	Basic radial load		Speed limit		Designation	Mass
							dyn. $C_r$	stat. $C_{0r}$	grease	oil		
							kN	min <sup>-1</sup>	-	Kg		
mm												
<b>85</b>	130	22	1,1	0,6	26	60,2	58,6	8500	15000	<b>7017 CTAP4</b>	0,930	
	130	22	1,1	0,6	26	60,2	58,6	8500	15000	<b>7017 CTAP2</b>	0,930	
	130	22	1,1	0,6	36	57	56	7500	13000	<b>7017 ATAP4</b>	0,930	
	130	22	1,1	0,6	36	57	56	7500	13000	<b>7017 ATAP2</b>	0,930	
	150	28	2	1	30	104	90	7500	13000	<b>7217 CTAP4</b>	1,753	
	150	28	2	1	30	104	90	7500	13000	<b>7217 CTAP2</b>	1,753	
	150	28	2	1	42	98	76,5	6700	11000	<b>7217 ATAP4</b>	1,753	
	150	28	2	1	42	98	76,5	6700	11000	<b>7217 ATAP2</b>	1,753	
	150	28	2	1	42	98	76,5	6700	11000	<b>7217 ATBP4</b>	1,753	
	150	28	2	1	42	98	76,5	6700	11000	<b>7217 ATBP2</b>	1,753	
<b>90</b>	140	24	1,5	0,6	28	71,6	69	7000	12000	<b>7018 CTAP4</b>	1,203	
	140	24	1,5	0,6	28	71,7	69,1	7500	13000	<b>7018 CTAP2</b>	1,203	
	140	24	1,5	0,6	28	71,7	69,1	7500	13000	<b>7018 CTBP4</b>	1,203	
	140	24	1,5	0,6	39	68	65,5	6700	11000	<b>7018 ATAP4</b>	1,203	
	140	24	1,5	0,6	39	68	65,5	6700	11000	<b>7018 ATAP2</b>	1,203	
	160	30	2	1	32	123	105	7000	12000	<b>7218 CTAP4</b>	2,153	
	160	30	2	1	32	123	105	7000	12000	<b>7218 CTAP2</b>	2,153	
	160	30	2	1	44	117	100	6000	9500	<b>7218 AMAP4</b>	2,153	
	160	30	2	1	44	117	100	6000	9500	<b>7218 ATAP4</b>	2,153	
	160	30	2	1	44	117	100	6000	9500	<b>7218 ATAP2</b>	2,153	
	160	30	2	1	44	117	100	6000	9500	<b>7218 ATBP4</b>	2,153	
	160	30	2	1	44	189	100	6000	9500	<b>7218 ATBP2</b>	2,153	
<b>95</b>	145	24	1,5	0,6	28	73,4	73,4	8000	14000	<b>7019 CTAP4</b>	1,253	
	145	24	1,5	0,6	28	73,4	73,4	8000	14000	<b>7019 CTAP2</b>	1,253	
	145	24	1,5	0,6	40	68	66	6300	10000	<b>7019 ATAP4</b>	1,253	
	145	24	1,5	0,6	40	68	66	6300	10000	<b>7019 ATAP2</b>	1,253	
	170	32	2,1	1,1	34	130	115	6300	10000	<b>7219 CTAP4</b>	2,653	
	170	32	2,1	1,1	34	130	115	6300	10000	<b>7219 CTAP2</b>	2,653	
	170	32	2,1	1,1	47	126	110	5600	9000	<b>7219 ATAP4</b>	2,653	
	170	32	2,1	1,1	47	126	110	5600	9000	<b>7219 ATAP2</b>	2,653	
	170	32	2,1	1,1	47	126	110	5600	9000	<b>7219 ATBP4</b>	2,653	
	170	32	2,1	1,1	47	126	110	5600	9000	<b>7219 ATBP2</b>	2,653	
<b>100</b>	150	24	1,5	0,6	29	75,3	77,2	7000	12000	<b>7020 CTAP4</b>	1,303	
	150	24	1,5	0,6	29	75,3	77,2	7000	12000	<b>7020 CTAP2</b>	1,303	
	150	24	1,5	0,6	41	71,1	73	6000	9500	<b>7020 AMBP4</b>	1,303	
	150	24	1,5	0,6	41	71	73	6000	9500	<b>7020 ATAP2</b>	1,303	
	150	24	1,5	0,6	41	71	73	6000	9500	<b>7020 ATAP4</b>	1,303	
	180	34	2,1	1,1	36	148	127	6000	9500	<b>7220 CTAP4</b>	3,203	
	180	34	2,1	1,1	36	150	127	6000	9500	<b>7220 CTAP2</b>	3,153	
	180	34	2,1	1,1	50	142	121	5300	8500	<b>7220 AMAP4</b>	3,153	
	180	34	2,1	1,1	50	142	121	5300	8500	<b>7220 ATAP4</b>	3,153	
	180	34	2,1	1,1	50	142	121	5300	8500	<b>7220 ATAP2</b>	3,153	
	180	34	2,1	1,1	50	142	121	5300	8500	<b>7220 ATBP4</b>	3,153	

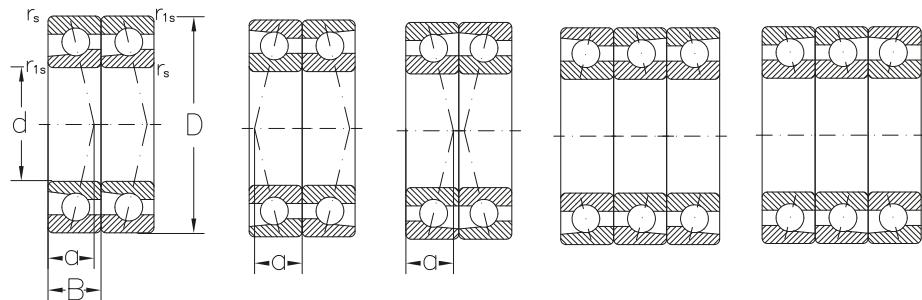
## High precision angular contact ball bearings single row



TA                    TB

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
mm						kN		min <sup>-1</sup>		-	
<b>100</b>	180	34	2,1	1,1	50	142	121	5300	8000	<b>7220 ATBP2</b>	3,153
<b>105</b>	160	26	2	1	31	87	89	5600	8500	<b>7021 CTAP4</b>	1,663
<b>110</b>	170	28	2	1	47	104	104	5300	8000	<b>7022 ATAP4</b>	3,203
<b>120</b>	180	28	2	2	34	109	111	5000	7500	<b>7024 CTBP4</b>	2,083
	180	28	2	2	49	104	105	5000	7500	<b>7024 AMAP4</b>	2,293
	180	28	2	2	49	104	105	5000	7500	<b>7024 ATAP4</b>	2,293
<b>130</b>	200	33	2	1	39	145	99	6300	8500	<b>7026 CMAP4</b>	3,193
	200	33	2	1	39	145	149	5600	7500	<b>7026 CTAP4</b>	3,193
<b>150</b>	225	35	2,1	1,1	61	159	173	4500	6000	<b>7030 CMAP4</b>	4,323
	225	35	2,1	1,1	61	159	173	4500	6000	<b>7030 CTAP4</b>	4,323
	225	35	2,1	1,1	61	159	173	5000	6700	<b>7030 AMAP4</b>	4,323

## High precision angular contact ball bearings, single row, for paired and stack mounted



DT

DB

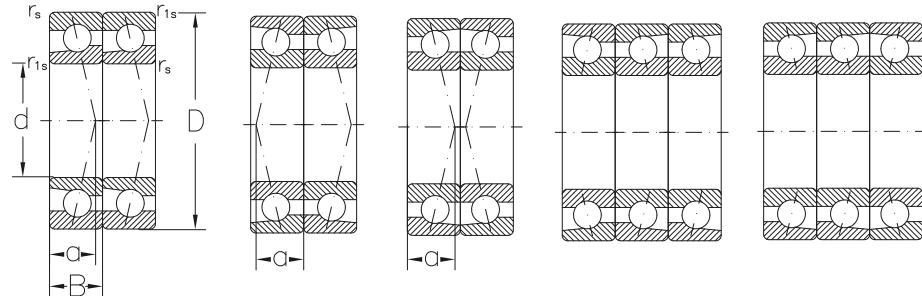
DF

TBT

TFT

Dimensions						Basic radial load	Speed limit		Designation	Mass
	d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil
						kN		min <sup>-1</sup>	-	Kg
<b>10</b>	26	8	0,3	0,1	6	8,6	4,9	48000	80000	<b>7000 CTAP4DT</b> 0,040
	26	8	0,3	0,1	6	8,6	4,9	43000	70000	<b>7000 CTAP4DB</b> 0,040
	26	8	0,3	0,1	6	8,6	4,9	43000	70000	<b>7000 CTAP4DF</b> 0,040
	30	9	0,6	0,3	7	9,4	5,9	43000	70000	<b>7200 CTAP4DT</b> 0,058
	30	9	0,6	0,3	7	9,4	5,9	38000	63000	<b>7200 CTAP4DB</b> 0,058
	30	9	0,6	0,3	7	9,4	5,9	38000	63000	<b>7200 CTAP4DF</b> 0,058
<b>12</b>	28	8	0,3	0,1	7	8,75	5,2	43000	70000	<b>7001 CTAP4DT</b> 0,046
	28	8	0,3	0,1	7	8,75	5,2	38000	63000	<b>7001 CTAP4DB</b> 0,046
	28	8	0,3	0,1	7	8,75	5,2	38000	63000	<b>7001 CTAP4DF</b> 0,046
	32	10	0,6	0,3	10	12,2	6,8	38000	63000	<b>7201 ATAP4DT</b> 0,060
	32	10	0,6	0,3	10	12,2	6,8	34000	56000	<b>7201 ATAP4DB</b> 0,060
	32	10	0,6	0,3	10	12,2	6,8	34000	56000	<b>7201 ATAP4DF</b> 0,060
<b>15</b>	32	9	0,3	0,1	8	10,2	6,8	36000	60000	<b>7002 CTAP4DT</b> 0,060
	32	9	0,3	0,1	8	10,2	6,8	32000	53000	<b>7002 CTAP4DB</b> 0,060
	32	9	0,3	0,1	8	10,2	6,8	32000	53000	<b>7002 CTAP4DF</b> 0,060
	32	9	0,3	0,1	8	16,6	13,6	28000	48000	<b>7002 CTAP4QBC</b> 0,120
	32	9	0,3	0,1	8	10,2	6,8	36000	60000	<b>7002 CTAP2DT</b> 0,060
	32	9	0,3	0,1	8	10,2	6,8	36000	60000	<b>7002 CTBP4DT</b> 0,060
	35	11	0,6	0,3	9	14,4	9	34000	56000	<b>7202 CTAP4DT</b> 0,084
	35	11	0,6	0,3	9	14,4	9	30000	50000	<b>7202 CTAP4DB</b> 0,084
	35	11	0,6	0,3	9	14,4	9	30000	50000	<b>7202 CTAP4DF</b> 0,084
	35	11	0,6	0,3	12	14,1	8,8	30000	50000	<b>7202 CTAP4DT</b> 0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	<b>7202 ATAP4DB</b> 0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	<b>7202 ATAP4DF</b> 0,048
	35	11	0,6	0,3	12	14,1	8,8	28000	45000	<b>7202 ATAP2DB</b> 0,084
<b>17</b>	35	10	0,3	0,1	9	11,7	8,4	32000	53000	<b>7003 CTAP4DT</b> 0,078
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	<b>7003 CTAP4DB</b> 0,078
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	<b>7003 CTAP4DF</b> 0,078
	35	10	0,3	0,1	9	15,6	16,8	28000	45000	<b>7003 CTAP4TBT</b> 0,117
	35	10	0,3	0,1	9	11,7	8,4	28000	48000	<b>7003 CTAP2DB</b> 0,078
	40	12	0,6	0,3	10	17,7	11,6	30000	50000	<b>7203 CTAP4DT</b> 0,120
	40	12	0,6	0,3	10	17,7	11,6	28000	45000	<b>7203 CTAP4DB</b> 0,120
	40	12	0,6	0,3	10	17,7	11,6	28000	45000	<b>7203 CTAP4DF</b> 0,120
	40	12	0,6	0,3	13	14,6	10,2	26000	43000	<b>7203 ATAP4DT</b> 0,120
	40	12	0,6	0,3	13	14,6	10,2	22000	38000	<b>7203 ATAP4DB</b> 0,120
	40	12	0,6	0,3	13	14,6	10,2	22000	38000	<b>7203 ATAP4DF</b> 0,120
<b>20</b>	42	12	0,6	0,3	10	17	12,2	28000	45000	<b>7004 CTAP4DT</b> 0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	<b>7004 CTAP4DB</b> 0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	<b>7004 CTAP4DF</b> 0,140
	42	12	0,6	0,3	27,7	24,2	22000	36000	<b>7004 CTAP4QBC</b> 0,280	

## High precision angular contact ball bearings, single row, for paired and stack mounted



DT

DB

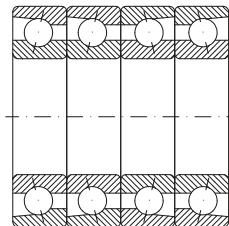
DF

TBT

TFT

	Dimensions					Basic radial load dyn. C <sub>r</sub>	Speed limit stat. C <sub>0r</sub>	grease	oil	Designation	Mass
	d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.						
mm											
<b>20</b>	42	12	0,6	0,3	10	17	12,2	24000	40000	<b>7004 CTAP2DB</b>	0,140
	42	12	0,6	0,3	10	17	12,2	24000	40000	<b>7004 CTBP4DB</b>	0,140
	42	12	0,6	0,3	10	17	12,2	28000	45000	<b>7004 CTBP2DT</b>	0,140
	42	12	0,6	0,3	13	16,2	11,6	24000	40000	<b>7004 ATAP4DT</b>	0,140
	42	12	0,6	0,3	13	16,2	11,6	22000	36000	<b>7004 ATAP4DB</b>	0,140
	42	12	0,6	0,3	13	16,2	11,6	22000	36000	<b>7004 ATAP4DF</b>	0,140
	47	14	1	0,6	12	25,3	18	26000	43000	<b>7204 CTAP4DT</b>	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	<b>7204 CTAP4DB</b>	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	<b>7204 CTAP4DF</b>	0,200
	47	14	1	0,6	12	25,3	18	26000	43000	<b>7204 CTBP4DT</b>	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	<b>7204 CTBP4DB</b>	0,200
	47	14	1	0,6	12	25,3	18	22000	38000	<b>7204 CTBP4DF</b>	0,200
	47	14	1	0,6	15	24,2	17,2	22000	38000	<b>7204 ATAP4DT</b>	0,200
	47	14	1	0,6	15	24,2	17,2	20000	34000	<b>7204 ATAP4DB</b>	0,200
	47	14	1	0,6	15	24,2	17,2	20000	34000	<b>7204 ATAP4DF</b>	0,200
<b>25</b>	47	12	0,6	0,3	11	17	14,8	24000	40000	<b>7005 CTAP4DT</b>	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	<b>7005 CTAP4DB</b>	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	<b>7005 CTAP4DF</b>	0,160
	47	12	0,6	0,3	11	19	14,8	24000	40000	<b>7005 CTAP2DT</b>	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	<b>7005 CTAP2DB</b>	0,160
	47	12	0,6	0,3	11	25,3	22,2	20000	34000	<b>7005 CTAP2TBT</b>	0,240
	47	12	0,6	0,3	11	19	14,8	24000	40000	<b>7005 CTBP2DT</b>	0,160
	47	12	0,6	0,3	11	19	14,8	22000	36000	<b>7005 CTBP2DB</b>	0,160
	47	12	0,6	0,3	15	16,9	13,9	22000	36000	<b>7005 ATAP4DT</b>	0,160
	47	12	0,6	0,3	15	16,9	13,9	19000	32000	<b>7005 ATAP4DB</b>	0,160
	47	12	0,6	0,3	15	16,9	13,9	19000	32000	<b>7005 ATAP4DF</b>	0,160
	52	15	1	0,6	13	26,9	20,6	22000	38000	<b>7205 CTAP4DT</b>	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	<b>7205 CTAP4DB</b>	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	<b>7205 CTAP4DF</b>	0,240
	52	15	1	0,6	13	43,8	41,2	18000	30000	<b>7205 CTAP4QBC</b>	0,120
	52	15	1	0,6	13	26,9	20,6	22000	38000	<b>7205 CTAP2DT</b>	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	<b>7205 CTAP2DB</b>	0,240
	52	15	1	0,6	13	26,9	20,6	22000	38000	<b>7205 CTBP4DT</b>	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	<b>7205 CTBP4DB</b>	0,240
	52	15	1	0,6	13	26,9	20,6	20000	34000	<b>7205 CTBP4DF</b>	0,240
	52	15	1	0,6	13	43,8	41,2	18000	30000	<b>7205 CTBP4QBC</b>	0,480
	52	15	1	0,6	17	22,2	17,6	20000	34000	<b>7205 ATAP4DT</b>	0,240
	52	15	1	0,6	17	22,2	17,6	18000	30000	<b>7205 ATAP4DB</b>	0,240
	52	15	1	0,6	17	22,2	17,6	18000	30000	<b>7205 ATAP4DF</b>	0,240
	52	15	1	0,6	17	29,6	26,4	17000	28000	<b>7205 ATAP4TFT</b>	0,360

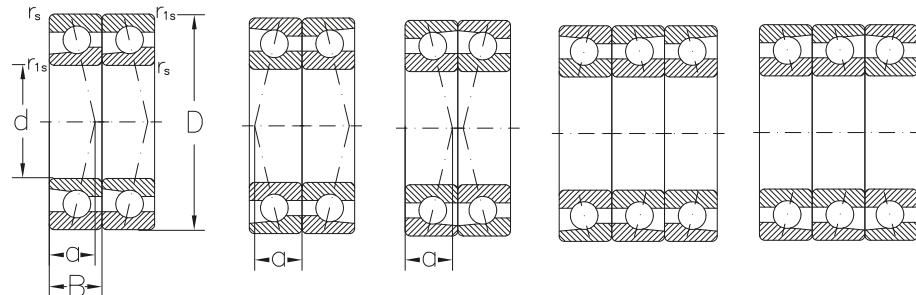
## High precision angular contact ball bearings, single row, for paired and stack mounted



QBC

Dimensions						Basic radial load dyn. C <sub>r</sub>	Speed limit stat. C <sub>0r</sub>	Designation	Mass		
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a						
mm						kN	min <sup>-1</sup>	-	Kg		
<b>30</b>	55	13	1	0,3	12	24,5	20,6	22000	36000	<b>7006 CTAP4DT</b>	0,240
	55	13	1	0,3	12	24,5	20,6	19000	32000	<b>7006 CTAP4DB</b>	0,240
	55	13	1	0,3	12	24,5	20,6	19000	32000	<b>7006 CTAP4DF</b>	0,240
	55	13	1	0,3	12	32,6	30,9	18000	30000	<b>7006 CTAP4TBT</b>	0,360
	55	13	1	0,3	12	24,5	20,6	19000	32000	<b>7006 CTAP2DB</b>	0,240
	55	13	1	0,3	12	24,5	20,6	22000	36000	<b>7006 CTBP2DT</b>	0,240
	55	13	1	0,3	17	21,7	19	19000	32000	<b>7006 ATAP4DT</b>	0,240
	55	13	1	0,3	17	21,7	19	17000	28000	<b>7006 ATAP4DB</b>	0,240
	55	13	1	0,3	17	21,7	19	17000	28000	<b>7006 ATAP4DF</b>	0,240
	62	16	1	0,6	14	37,3	29,6	20000	34000	<b>7206 CTAP4DT</b>	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	<b>7206 CTAP4DB</b>	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	<b>7206 CTAP4DF</b>	0,380
	62	16	1	0,6	14	49,7	44,4	17000	28000	<b>7206 CTAP4TT</b>	0,570
	62	16	1	0,6	14	49,7	44,4	17000	28000	<b>7206 CTAP4TBT</b>	0,570
	62	16	1	0,6	14	60,7	59,2	16000	26000	<b>7206 CTAP4QFC</b>	0,760
	62	16	1	0,6	14	37,3	29,6	20000	34000	<b>7206 CTAP2DT</b>	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	<b>7206 CTAP2DB</b>	0,380
	62	16	1	0,6	14	37,3	29,6	20000	34000	<b>7206 BTBP4DT</b>	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	<b>7206 CTBP4DB</b>	0,380
	62	16	1	0,6	14	37,3	29,6	18000	30000	<b>7206 CTBP4DF</b>	0,380
	62	16	1	0,6	14	49,7	44,4	17000	28000	<b>7206 CTBP4TT</b>	0,570
	62	16	1	0,6	14	60,7	59,2	16000	26000	<b>7206 CTBP4QFC</b>	0,760
	62	16	1	0,6	19	35,7	28,2	18000	30000	<b>7206 ATAP4DT</b>	0,380
	62	16	1	0,6	19	35,7	28,2	17000	28000	<b>7206 ATP4DB</b>	0,380
	62	16	1	0,6	19	35,7	28,2	17000	28000	<b>7206 ATAP4DF</b>	0,380
<b>35</b>	62	14	1	0,3	14	31,1	27,4	19000	32000	<b>7007 CTAP4DT</b>	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	<b>7007 CTAP4DB</b>	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	<b>7007 CTAP4DF</b>	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	<b>7007 CTAP2DB</b>	0,320
	62	14	1	0,3	14	31,1	27,4	17000	28000	<b>7007 CTBP4DB</b>	0,320
	62	14	1	0,3	14	31,1	27,4	19000	32000	<b>7007 CTBP2DT</b>	0,320
	62	14	1	0,3	19	29,5	26,2	17000	28000	<b>7007 ATAP4DT</b>	0,320
	62	14	1	0,3	19	29,5	26,2	16000	26000	<b>7007 ATAP4DB</b>	0,320
	62	14	1	0,3	19	29,5	26,2	16000	26000	<b>7007 ATAP4DF</b>	0,320
	72	17	1,1	0,6	16	49,3	40,4	18000	30000	<b>7207 CTAP4DT</b>	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	<b>7207 CTAP4DB</b>	0,540
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	<b>7207 CTAP4DF</b>	0,540
	72	17	1,1	0,6	16	65,7	60,6	16000	26000	<b>7207 CTAP4TFT</b>	0,810
	72	17	1,1	0,6	16	80,3	80,8	14000	24000	<b>7207 CTAP4QFC</b>	1,083

## High precision angular contact ball bearings, single row, for paired and stack mounted



DT

DB

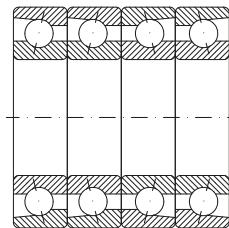
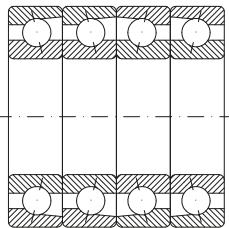
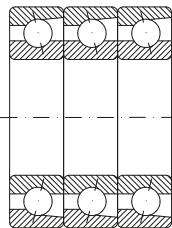
DF

TBT

TFT

Dimensions	d	D	B	$r_s$ min.	$r_{1s}$ min.	a	Basic radial load		Speed limit		Designation	Mass
							dyn. $C_r$	stat. $C_{0r}$	grease	oil		
							kN	min <sup>-1</sup>	-	Kg		
mm												
<b>35</b>	72	17	1,1	0,6	16	49,3	40,4	18000	30000	<b>7207 CTBP4DT</b>	0,540	
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	<b>7207 CTBP4DB</b>	0,540	
	72	17	1,1	0,6	16	49,3	40,4	17000	28000	<b>7207 CTBP4DF</b>	0,540	
	72	17	1,1	0,6	21	39,7	34	16000	26000	<b>7207 ATAP4DT</b>	0,540	
	72	17	1,1	0,6	21	39,7	34	13000	22000	<b>7207 ATAP4DB</b>	0,540	
	72	17	1,1	0,6	21	39,7	34	13000	22000	<b>7207 ATAP4DF</b>	0,540	
<b>40</b>	68	15	1	0,3	15	33,4	31,8	18000	30000	<b>7008 CTAP4DT</b>	0,380	
	68	15	1	0,3	15	33,4	31,8	17000	28000	<b>7008 CTAP4DB</b>	0,380	
	68	15	1	0,3	15	33,4	31,8	17000	28000	<b>7008 CTAP4DF</b>	0,380	
	68	15	1	0,3	15	33,4	31,8	18000	30000	<b>7008 CTAP2DT</b>	0,380	
	68	15	1	0,3	15	33,4	31,8	17000	28000	<b>7008 CTAP2DB</b>	0,380	
	68	15	1	0,3	15	33,4	31,8	18000	30000	<b>7008 CTBP4DT</b>	0,380	
	68	15	1	0,3	15	33,4	31,8	17000	28000	<b>7008 CTBP4DB</b>	0,380	
	68	15	1	0,3	20	31,6	30	16000	26000	<b>7008 ATAP4DT</b>	0,380	
	68	15	1	0,3	20	31,6	30	13000	22000	<b>7008 ATAP4DB</b>	0,380	
	68	15	1	0,3	20	31,6	30	13000	22000	<b>7008 ATAP4DF</b>	0,380	
	68	15	1	0,3	20	31,6	30	13000	22000	<b>7008 ATBP4DB</b>	0,380	
	68	15	1	0,3	15	44,5	47,7	13000	22000	<b>7008 ATBP4TBT</b>	0,570	
	80	18	1,1	0,6	17	58,8	50,4	17000	28000	<b>7208 CTAP4DT</b>	0,700	
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	<b>7208 CTAP4DB</b>	0,700	
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	<b>7208 CTAP4DF</b>	0,700	
	80	18	1,1	0,6	17	58,8	50,4	17000	28000	<b>7208 CTBP4DT</b>	0,700	
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	<b>7208 CTBP4DB</b>	0,700	
	80	18	1,1	0,6	17	58,8	50,4	14000	24000	<b>7208 CTBP4DF</b>	0,700	
	80	18	1,1	0,6	17	78,4	75,6	13000	22000	<b>7208 CTBP4TT</b>	1,053	
	80	18	1,1	0,6	17	95,8	101	13000	22000	<b>7208 CTBP4QT</b>	1,403	
	80	18	1,1	0,6	17	95,8	101	13000	22000	<b>7208 CTBP4QFC</b>	1,403	
	80	18	1,1	0,6	23	57	48,8	14000	24000	<b>7208 ATAP4DT</b>	0,700	
	80	18	1,1	0,6	23	57	48,8	12000	20000	<b>7208 ATAP4DB</b>	0,700	
	80	18	1,1	0,6	23	57	48,8	12000	20000	<b>7208 ATAP4DF</b>	0,700	
	80	18	1,1	0,6	23	57	48,8	14000	24000	<b>7208 ATBP4DT</b>	0,700	
	80	18	1,1	0,6	23	57	48,8	12000	20000	<b>7208 ATBP4DB</b>	0,700	
	80	18	1,1	0,6	17	95,8	101	11000	18000	<b>7208 ATBP4QT</b>	1,403	
<b>45</b>	75	16	1	0,3	16	39,5	38,6	16000	26000	<b>7009 CTAP4DT</b>	0,500	
	75	16	1	0,3	16	39,5	38,6	13000	22000	<b>7009 CTAP4DB</b>	0,500	
	75	16	1	0,3	16	39,5	38,6	13000	22000	<b>7009 CTAP4DF</b>	0,500	
	75	16	1	0,3	16	52,7	57,9	13000	22000	<b>7009 CTAP4BT</b>	0,750	
	75	16	1	0,3	16	64,5	77,2	12000	20000	<b>7009 CTAP4QBC</b>	1,003	
	75	16	1	0,3	16	39,5	38,6	16000	26000	<b>7009 CTAP2DT</b>	0,500	
	75	16	1	0,3	16	39,5	38,6	13000	22000	<b>7009 CTAP2DB</b>	0,500	

## High precision angular contact ball bearings, single row, for paired and stack mounted



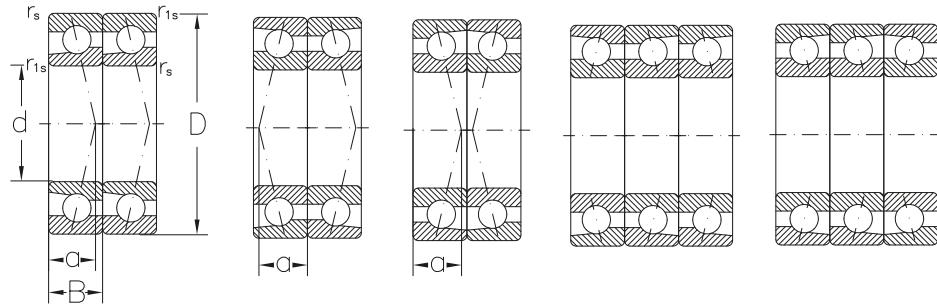
TT

QFC

QBC

Dimensions						Basic radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit		Designation	Mass Kg	
d	D	B	$r_s$ min.	$r_{1s}$ min.	a			grease	oil			
						kN	$\text{min}^{-1}$		-			
<b>45</b>	75	16	1	0,3	22	35,7	34,6	14000	24000	<b>7009 ATAP4DT</b>	0,500	
	75	16	1	0,3	22	35,7	34,6	12000	20000	<b>7009 ATAP4DB</b>	0,500	
	75	16	1	0,3	22	35,7	34,6	12000	20000	<b>7009 ATAP4DF</b>	0,500	
	85	19	1,1	0,6	18	64,8	58	14000	24000	<b>7209 CTAP4DT</b>	0,800	
	85	19	1,1	0,6	18	64,8	58	12000	20000	<b>7209 CTAP4DB</b>	0,800	
	85	19	1,1	0,6	18	64,8	58	12000	20000	<b>7209 CTAP4DF</b>	0,800	
	85	19	1,1	0,6	18	64,8	58	14000	24000	<b>7209 CTAP2DT</b>	0,800	
	85	19	1,1	0,6	25	59,6	55	12000	20000	<b>7209 ATAP4DT</b>	0,800	
	85	19	1,1	0,6	25	59,6	55	11000	18000	<b>7209 ATAP4DB</b>	0,800	
	85	19	1,1	0,6	25	59,6	55	11000	18000	<b>7209 ATAP4DF</b>	0,800	
	85	19	1,1	0,6	18	64,8	58	11000	18000	<b>7209 CTAP2DB</b>	0,800	
	85	19	1,1	0,6	25	59,6	55	12000	20000	<b>7209 ATBP4DT</b>	0,800	
	85	19	1,1	0,6	25	59,6	55	11000	18000	<b>7209 ATBP4DB</b>	0,800	
	85	19	1,1	0,6	25	59,6	55	11000	18000	<b>7209 ATBP4DF</b>	0,800	
<b>50</b>	80	16	1	0,3	17	40,7	41,4	14000	24000	<b>7010 CTAP4DT</b>	0,520	
	80	16	1	0,3	17	40,7	41,4	12000	20000	<b>7010 CTAP4DB</b>	0,520	
	80	16	1	0,3	17	40,7	41,4	12000	20000	<b>7010 CTAP4DF</b>	0,520	
	80	16	1	0,3	17	66,3	82,8	11000	18000	<b>7010 CTAP4QBC</b>	1,043	
	80	16	1	0,3	17	40,7	41,4	14000	24000	<b>7010 CTAP2DT</b>	0,520	
	80	16	1	0,3	17	40,7	41,4	12000	20000	<b>7010 CTAP2DB</b>	0,520	
	80	16	1	0,3	23	37,6	40	12000	20000	<b>7010 ATAP4DT</b>	0,520	
	80	16	1	0,3	23	37,6	40	11000	18000	<b>7010 ATAP4DB</b>	0,520	
	80	16	1	0,3	23	37,6	40	11000	18000	<b>7010 ATAP4DF</b>	0,520	
	90	20	1,1	0,6	20	69,4	63,4	13000	22000	<b>7210 CTAP4DT</b>	0,900	
	90	20	1,1	0,6	20	69,4	63,4	11000	19000	<b>7210 CTAP4DB</b>	0,900	
	90	20	1,1	0,6	20	69,4	63,4	11000	19000	<b>7210 CTAP4DF</b>	0,900	
	90	20	1,1	0,6	27	68	62	11000	18000	<b>7210 ATAP4DT</b>	0,900	
	90	20	1,1	0,6	27	68	62	9500	16000	<b>7210 ATAP4DB</b>	0,900	
<b>55</b>	90	20	1,1	0,6	27	68	62	9500	16000	<b>7210 ATAP4DF</b>	0,900	
	90	20	1,1	0,6	27	68	62	11000	18000	<b>7210 ATBP4DT</b>	0,900	
	90	20	1,1	0,6	27	68	62	9500	16000	<b>7210 ATBP4DB</b>	0,900	
	90	20	1,1	0,6	27	68	62	11000	18000	<b>7210 ATBP4DF</b>	0,900	
	90	20	1,1	0,6	27	68	62	9500	16000	<b>7210 ATAP4DF</b>	0,900	
	90	20	1,1	0,6	27	68	62	11000	18000	<b>7210 ATAP2DT</b>	0,900	
	90	18	1,1	0,6	19	55,3	57,2	12000	20000	<b>7011 CTAP4DT</b>	0,780	
	90	18	1,1	0,6	19	55,3	57,2	11000	18000	<b>7011 CTAP4DB</b>	0,780	
	90	18	1,1	0,6	19	55,3	57,2	11000	18000	<b>7011 CTAP4DF</b>	0,780	
	90	18	1,1	0,6	19	73,7	85,2	10000	17000	<b>7011 CTAP4TT</b>	1,173	
	90	18	1,1	0,6	19	73,7	85,2	10000	17000	<b>7011 CTAP4TBT</b>	1,173	
	90	18	1,1	0,6	26	52,3	54,2	11000	18000	<b>7011 ATAP4DT</b>	0,780	
	90	18	1,1	0,6	26	52,3	54,2	9500	16000	<b>7011 ATAP4DB</b>	0,780	

## High precision angular contact ball bearings, single row, for paired and stack mounted



DT

DB

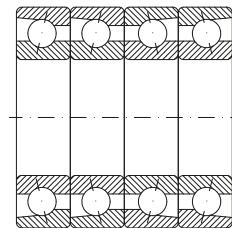
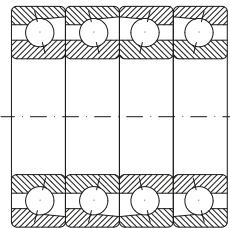
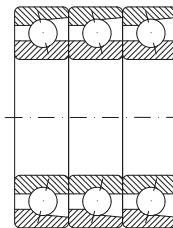
DF

TBT

TFT

Dimensions	d	D	B	$r_s$ min.	$r_{1s}$ min.	a	Basic radial load		Speed limit		Designation	Mass
							dyn. $C_r$	stat. $C_{0r}$	grease	oil		
							kN	min <sup>-1</sup>	-	Kg		
<b>55</b>	90	18	1,1	0,6	26	523,	54,2	9500	16000	<b>7011 ATAP4DF</b>	0,780	
	100	21	1,5	1	21	85,9	80	11000	18000	<b>7211 CTAP4DT</b>	1,203	
	100	21	1,5	1	21	85,9	80	9500	16000	<b>7211 CTAP4DB</b>	1,203	
	100	21	1,5	1	21	85,9	80	9500	16000	<b>7211 CTAP4DF</b>	1,203	
	100	21	1,5	1	29	82	76,6	10000	17000	<b>7211 ATAP4DT</b>	1,203	
	100	21	1,5	1	29	82	76,6	9000	15000	<b>7211 ATAP4DB</b>	1,203	
	100	21	1,5	1	29	82	76,6	9000	15000	<b>7211 ATAP4DF</b>	1,203	
	100	21	1,5	1	29	82	76,6	9000	15000	<b>7211 ATAP2DB</b>	1,203	
	100	21	1,5	1	29	82	76,6	10000	17000	<b>7211 ATBP4DT</b>	1,203	
	100	21	1,5	1	29	82	76,6	9000	15000	<b>7211 ATBP4DB</b>	1,203	
<b>60</b>	95	18	1,1	0,6	20	56,7	61	11000	18000	<b>7012 CTAP4DT</b>	0,840	
	95	18	1,1	0,6	20	56,7	61	9500	16000	<b>7012 CTAP4DB</b>	0,840	
	95	18	1,1	0,6	20	56,7	61	9500	16000	<b>7012 CTAP4DF</b>	0,840	
	95	18	1,1	0,6	20	75,6	91,5	9500	15000	<b>7012 CTAP4TBT</b>	1,263	
	95	18	1,1	0,6	20	92,4	122	8500	14000	<b>7012 CTAP4QBC</b>	1,683	
	95	18	1,1	0,6	20	56,7	61	9500	16000	<b>7012 CTBP2DB</b>	0,840	
	95	18	1,1	0,6	27	53,8	58,2	10000	17000	<b>7012 ATAP4DT</b>	0,840	
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	<b>7012 ATAP4DB</b>	0,840	
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	<b>7012 ATAP4DF</b>	0,840	
	95	18	1,1	0,6	27	53,8	58,2	9000	15000	<b>7012 ATAP2DF</b>	0,840	
	110	22	1,5	1	23	104	98	10000	17000	<b>7212 CTAP4DT</b>	1,543	
	110	22	1,5	1	23	104	98	9000	15000	<b>7212 CTAP4DB</b>	1,543	
	110	22	1,5	1	23	104	98	9000	15000	<b>7212 CTAP4DF</b>	1,543	
	110	22	1,5	1	23	138	147	8500	14000	<b>7212 CTAP4TBT</b>	2,313	
	110	22	1,5	1	23	104	98	9000	15000	<b>7212 CTAP2DB</b>	1,543	
<b>65</b>	110	22	1,5	1	31	98,8	95	9000	15000	<b>7212 ATAP4DT</b>	1,543	
	110	22	1,5	1	31	98,8	95	8500	14000	<b>7212 ATAP4DB</b>	1,543	
	110	22	1,5	1	31	98,8	95	8500	14000	<b>7212 ATAP4DF</b>	1,543	
	110	22	1,5	1	31	98,8	95	9000	15000	<b>7212 ATBP4DT</b>	1,543	
	110	22	1,5	1	31	98,8	95	8500	14000	<b>7212 ATBP4DB</b>	1,543	
	110	22	1,5	1	31	98,8	95	8500	14000	<b>7212 ATBP4DF</b>	1,543	
	110	22	1,5	1	31	98,8	95	8500	14000	<b>7212 ATBP4TBT</b>	2,313	
	100	18	1,1	0,6	20	58,3	65	11000	18000	<b>7013 CTAP4DT</b>	0,920	
	100	18	1,1	0,6	20	58,3	65	9500	16000	<b>7013 CTAP4DB</b>	0,920	
	100	18	1,1	0,6	20	58,3	65	9500	16000	<b>7013 CTAP4DF</b>	0,920	
	100	18	1,1	0,6	20	77,8	97,5	9000	15000	<b>7013 CTAP4TBT</b>	1,383	
	100	18	1,1	0,6	20	95	130	8500	14000	<b>7013 CTAP4QBC</b>	1,843	
	100	18	1,1	0,6	20	77,8	97,5	9000	15000	<b>7013 CTAP2TBT</b>	1,383	
	100	18	1,1	0,6	28	55	62	9500	16000	<b>7013 AMBP4DT</b>	0,920	
	100	18	1,1	0,6	28	55	62	8500	14000	<b>7013 ATAP4DB</b>	0,920	

## High precision angular contact ball bearings, single row, for paired and stack mounted



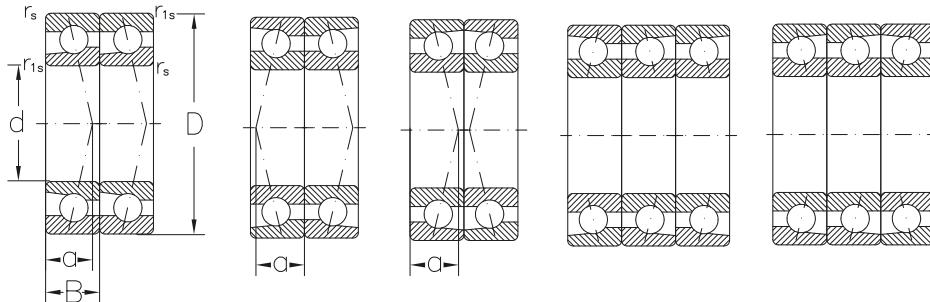
TT

QFC

QBC

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
mm											
<b>65</b>	100	18	1,1	0,6	28	55	62	8500	14000	<b>7013 ATAP4DF</b>	0,920
	120	23	1,5	1	24	117	114	9500	20000	<b>7213 CTAP4DT</b>	1,943
	120	23	1,5	1	24	117	114	8500	14000	<b>7213 CTAP4DB</b>	1,943
	120	23	1,5	1	24	117	114	8500	14000	<b>7213 CTAP4DF</b>	1,943
	120	23	1,5	1	24	117	114	9500	16000	<b>7213 CTAP2DT</b>	1,943
	120	23	1,5	1	33	113	108	8500	14000	<b>7213 ATAP4DT</b>	1,943
	120	23	1,5	1	33	113	108	8000	13000	<b>7213 ATAP4DB</b>	1,943
	120	23	1,5	1	33	113	108	8000	13000	<b>7213 ATAP4DF</b>	1,943
	120	23	1,5	1	33	113	108	8500	14000	<b>7213 ATBP4DT</b>	1,943
	120	23	1,5	1	33	113	108	8000	13000	<b>7213 ATBP4DB</b>	1,943
<b>70</b>	110	20	1,1	0,6	22	73,4	81,6	9500	16000	<b>7014 CTAP4DT</b>	1,283
	110	20	1,1	0,6	22	73,4	81,6	8500	14000	<b>7014 CTAP4DB</b>	1,283
	110	20	1,1	0,6	22	73,4	81,6	8500	14000	<b>7014 CTAP4DF</b>	1,283
	110	20	1,1	0,6	31	93	102	8500	14000	<b>7014 CTAP4TBT</b>	1,923
	110	20	1,1	0,6	31	69,7	68	8500	14000	<b>7014 AMBP4DT</b>	1,283
	110	20	1,1	0,6	31	114	136	6700	11000	<b>7014 AMBP4QBC</b>	2,563
	110	20	1,1	0,6	31	69,7	68	8500	14000	<b>7014 ATAP4DT</b>	1,283
	110	20	1,1	0,6	31	69,7	68	8000	12000	<b>7014 ATAP4DB</b>	1,283
	110	20	1,1	0,6	31	69,7	68	8000	13000	<b>7014 ATAP4DF</b>	1,283
	110	20	1,1	0,6	31	93	102	7000	13000	<b>7014 ATAP2TBT</b>	1,923
	125	24	1,5	1	25	123	120	9000	15000	<b>7214 CTAP4DT</b>	2,103
	125	24	1,5	1	25	123	120	8500	14000	<b>7214 CTAP4DB</b>	2,103
	125	24	1,5	1	25	123	120	8500	14000	<b>7214 CTAP4DF</b>	2,103
	125	24	1,5	1	25	123	120	8500	14000	<b>7214 CTAP2DB</b>	2,103
	125	24	1,5	1	35	126	114	8500	14000	<b>7214 ATAP4DT</b>	2,103
	125	24	1,5	1	35	126	114	7000	12000	<b>7214 ATAP4DB</b>	2,103
	125	24	1,5	1	35	126	114	7000	12000	<b>7214 ATAP4DF</b>	2,103
	125	24	1,5	1	35	126	114	8500	14000	<b>7214 ATBP4DT</b>	2,103
	125	24	1,5	1	35	126	114	7000	12000	<b>7214 ATBP4DB</b>	2,103
	125	24	1,5	1	35	126	114	7000	12000	<b>7214 ATBP4DF</b>	2,103
<b>75</b>	115	20	1,1	0,6	23	75,4	87	9500	16000	<b>7015 CTAP4DT</b>	1,363
	115	20	1,1	0,6	23	75,4	87	8500	14000	<b>7015 CTAP4DB</b>	1,363
	115	20	1,1	0,6	23	75,4	87	8500	14000	<b>7015 CTAP4DF</b>	1,363
	115	20	1,1	0,6	32	71,3	82,4	7000	12000	<b>7015 AMAP4DB</b>	1,363
	115	20	1,1	0,6	23	100	131	6700	11000	<b>7015 AMAP4TBT</b>	2,043
	115	20	1,1	0,6	32	116	165	6700	11000	<b>7015 AMAP4QBC</b>	2,723
	115	20	1,1	0,6	32	71,3	82,4	8500	14000	<b>7015 ATAP4DT</b>	1,363
	115	20	1,1	0,6	32	71,3	82,4	7000	11000	<b>7015 ATAP4DB</b>	1,363
	115	20	1,1	0,6	32	71,3	82,4	7000	11000	<b>7015 ATAP4DF</b>	1,363

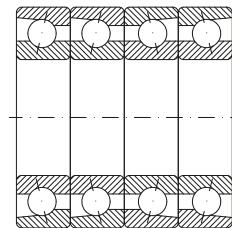
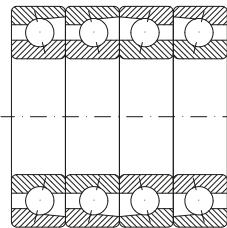
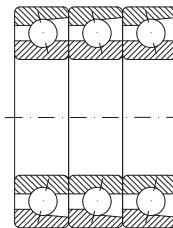
## High precision angular contact ball bearings, single row, for paired and stack mounted



**DT                  DB                  DF                  TBT                  TFT**

Dimensions	d	D	B	$r_s$ min.	$r_{1s}$ min.	a	Basic radial load		Speed limit		Designation	Mass
							dyn. $C_r$	stat. $C_{0r}$	grease	oil		
							kN	min <sup>-1</sup>	-	Kg		
<b>75</b>	115	20	1,1	0,6	32	71,3	82,4	7000	12000	<b>7015 ATBP2DB</b>	1,363	
	130	25	1,5	1	26	130	131	8500	14000	<b>7215 CTAP4DT</b>	2,303	
	130	25	1,5	1	26	130	131	8000	13000	<b>7215 CTAP4DB</b>	2,303	
	130	25	1,5	1	26	130	131	8000	13000	<b>7215 CTAP4DF</b>	2,303	
	130	25	1,5	1	37	118	121	8000	13000	<b>7215 ATAP4DT</b>	2,303	
	130	25	1,5	1	37	118	121	6700	11000	<b>7215 ATAP4DB</b>	2,303	
	130	25	1,5	1	37	118	121	6700	11000	<b>7215 ATAP4DF</b>	2,303	
	130	25	1,5	1	37	118	121	8000	13000	<b>7215 ATBP4DT</b>	2,303	
	130	25	1,5	1	37	118	121	6700	11000	<b>7215 ATBP4DB</b>	2,303	
	130	25	1,5	1	37	118	121	6700	11000	<b>7215 ATBP4DF</b>	2,303	
<b>80</b>	125	22	1,1	0,6	25	95	110	8500	14000	<b>7016 CTAP4DT</b>	1,783	
	125	22	1,1	0,6	25	95	110	8000	13000	<b>7016 CTAP4DB</b>	1,783	
	125	22	1,1	0,6	25	95	110	8000	13000	<b>7016 CTAP4DF</b>	1,783	
	125	22	1,1	0,6	35	91	126	8000	13000	<b>7016 AMAP4DT</b>	1,783	
	125	22	1,1	0,6	35	91	126	6700	11000	<b>7016 AMAP4DB</b>	1,783	
	125	22	1,1	0,6	25	155	221	6000	10000	<b>7016 AMAP4QBC</b>	3,563	
	125	22	1,1	0,6	35	91	126	8000	13000	<b>7016 ATAP4DT</b>	1,783	
	125	22	1,1	0,6	35	91	126	6700	11000	<b>7016 ATAP4DB</b>	1,783	
	125	22	1,1	0,6	35	91	126	6700	11000	<b>7016 ATAP4DF</b>	1,783	
	140	26	2	1	28	151	156	7000	12000	<b>7216 CTAP4DT</b>	2,803	
	140	26	2	1	28	151	156	6000	10000	<b>7216 CTAP4DB</b>	2,803	
	140	26	2	1	28	151	156	6000	10000	<b>7216 CTAP4DF</b>	2,803	
	140	26	2	1	28	201	234	6000	10000	<b>7216 CTAP4TBT</b>	4,203	
	140	26	2	1	28	151	156	7000	12000	<b>7216 CTAP2DT</b>	2,803	
	140	26	2	1	28	151	156	6000	10000	<b>7216 CTAP2DB</b>	2,803	
	140	26	2	1	28	151	156	6000	10000	<b>7216 CTAP2DF</b>	2,803	
	140	26	2	1	28	246	312	5300	9000	<b>7216 CTAP2QBC</b>	5,603	
	140	26	2	1	39	139	147	6700	11000	<b>7216 ATAP4DT</b>	2,803	
	140	26	2	1	39	139	147	5600	9500	<b>7216 ATAP4DB</b>	2,803	
	140	26	2	1	39	139	147	5600	9500	<b>7216 ATAP4DF</b>	2,803	
	140	26	2	1	39	139	147	6700	11000	<b>7216 ATBP4DT</b>	2,803	
	140	26	2	1	39	139	147	5600	9500	<b>7216 ATBP4DB</b>	2,803	
	140	26	2	1	39	139	147	5600	9500	<b>7216 ATBP4DF</b>	2,803	
<b>85</b>	130	22	1,1	0,6	26	97,5	117	8500	14000	<b>7017 CTAP4DT</b>	1,863	
	130	22	1,1	0,6	26	97,5	117	7000	12000	<b>7017 CTAP4DB</b>	1,863	
	130	22	1,1	0,6	26	97,5	117	7000	12000	<b>7017 CTAP4DF</b>	1,863	
	130	22	1,1	0,6	36	92	112	7000	12000	<b>7017 ATAP4DT</b>	1,863	
	130	22	1,1	0,6	36	92	112	6000	10000	<b>7017 ATAP4DB</b>	1,863	
	130	22	1,1	0,6	36	92	112	6000	10000	<b>7017 ATAP4DF</b>	1,863	
	150	28	2	1	30	168	180	7000	12000	<b>7217 CTAP4DT</b>	3,503	

## High precision angular contact ball bearings, single row, for paired and stack mounted



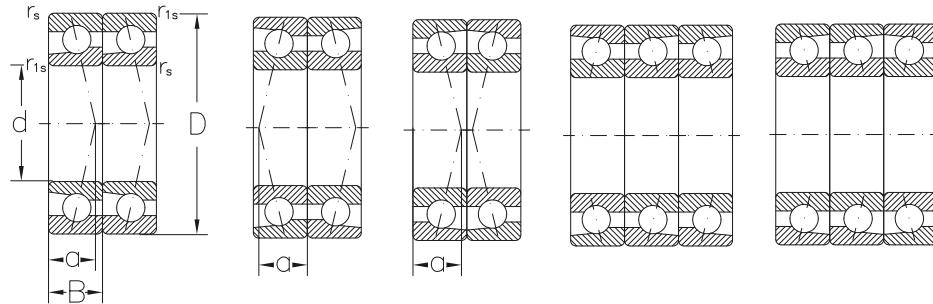
TT

QFC

QBC

Dimensions						Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
mm						kN		min <sup>-1</sup>		-	
<b>85</b>	150	28	2	1	30	168	180	6000	10000	<b>7217 CTAP4DB</b>	3,503
	150	28	2	1	30	168	180	6000	10000	<b>7217 CTAP4DF</b>	3,503
	150	28	2	1	42	159	153	6000	10000	<b>7217 ATAP4DT</b>	3,503
	150	28	2	1	42	159	153	5300	9000	<b>7217 ATAP4DB</b>	3,503
	150	28	2	1	42	159	153	5300	9000	<b>7217 ATAP4DF</b>	3,503
	150	28	2	1	42	159	153	6000	10000	<b>7217 ATBP4DT</b>	3,503
	150	28	2	1	42	159	153	5300	9000	<b>7217 ATBP4DB</b>	3,503
	150	28	2	1	42	159	153	5300	9000	<b>7217 ATBP4DF</b>	3,503
<b>90</b>	140	24	1,5	0,6	28	116	138	7000	12000	<b>7018 CMBP4DT</b>	2,403
	140	24	1,5	0,6	28	116	138	7000	12000	<b>7018 CTAP4DT</b>	2,403
	140	24	1,5	0,6	28	116	138	6000	10000	<b>7018 CTAP4DB</b>	2,403
	140	24	1,5	0,6	28	116	138	6000	10000	<b>7018 CTAP4DF</b>	2,403
	140	24	1,5	0,6	28	155	207	5300	10000	<b>7018 CTAP2TBT</b>	3,603
	140	24	1,5	0,6	39	110	131	6000	10000	<b>7018 AMBP4DT</b>	2,403
	140	24	1,5	0,6	39	147	262	5000	8500	<b>7018 AMBP4TBT</b>	3,603
	140	24	1,5	0,6	39	180	262	4500	7500	<b>7018 AMBP4QT</b>	4,803
	140	24	1,5	0,6	39	110	131	6000	10000	<b>7018 ATAP4DT</b>	2,403
	140	24	1,5	0,6	39	110	131	5300	9000	<b>7018 ATAP4DB</b>	2,403
	140	24	1,5	0,6	39	110	131	5300	9000	<b>7018 ATAP4DF</b>	2,403
	160	30	2	1	32	199	210	6700	11000	<b>7218 CTAP4DT</b>	4,303
	160	30	2	1	32	199	210	5600	9500	<b>7218 CTAP4DB</b>	4,303
	160	30	2	1	32	199	210	5600	9500	<b>7218 CTAP4DF</b>	4,303
	160	30	2	1	44	189	200	5000	8500	<b>7218 AMAP4DT</b>	4,303
	160	30	2	1	44	189	200	4500	7500	<b>7218 AMAP4DB</b>	4,303
	160	30	2	1	44	189	200	4500	7500	<b>7218 AMAP4DF</b>	4,303
	160	30	2	1	44	189	200	5000	8500	<b>7218 ATAP4DT</b>	4,303
	160	30	2	1	44	189	200	4500	7500	<b>7218 ATAP4DB</b>	4,303
	160	30	2	1	44	189	200	4500	7500	<b>7218 ATAP4DF</b>	4,303
	160	30	2	1	44	189	200	5000	8500	<b>7218 ATBP4DT</b>	4,303
	160	30	2	1	44	189	200	4500	7500	<b>7218 ATBP4DB</b>	4,303
	160	30	2	1	44	189	200	4500	7500	<b>7218 ATBP4DF</b>	4,303
<b>95</b>	145	24	1,5	0,6	28	119	147	8000	13000	<b>7019 CTAP4DT</b>	2,503
	145	24	1,5	0,6	28	119	147	6700	11000	<b>7019 CTAP4DB</b>	2,503
	145	24	1,5	0,6	28	119	147	6700	11000	<b>7019 CTAP4DF</b>	2,503
	145	24	1,5	0,6	40	110	132	5300	9000	<b>7019 ATAP4DT</b>	2,503
	145	24	1,5	0,6	40	110	132	4800	8000	<b>7019 ATAP4DB</b>	2,503
	145	24	1,5	0,6	40	110	132	4800	8000	<b>7019 ATAP4DF</b>	2,503
	170	32	21,1	1,1	34	211	230	5300	9000	<b>7219 CTAP4DT</b>	5,303
	170	32	21,1	1,1	34	211	230	4800	8000	<b>7219 CTAP4DB</b>	5,303
	170	32	21,1	1,1	34	211	230	4800	8000	<b>7219 CTAP4DF</b>	5,303

## High precision angular contact ball bearings, single row, for paired and stack mounted



**DT                  DB                  DF                  TBT                  TFT**

Dimensions						Basic radial load		Speed limit		Designation	Mass
	d	D	B	r <sub>s</sub> min.	r <sub>1s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	
										-	Kg
<b>95</b>	170	32	21,1	1,1	34	211	230	4800	8000	<b>7219 CTAP4DB</b>	5,303
	170	32	21,1	1,1	47	204	220	4800	8000	<b>7219 ATAP4DT</b>	5,303
	170	32	21,1	1,1	47	204	220	4300	7000	<b>7219 ATAP4DB</b>	5,303
	170	32	21,1	1,1	47	204	220	4300	7000	<b>7219 ATAP4DF</b>	5,303
	170	32	21,1	1,1	47	126	220	4800	8000	<b>7219 ATBP4DT</b>	5,303
	170	32	21,1	1,1	47	126	220	4300	7000	<b>7219 ATBP4DB</b>	5,303
	170	32	21,1	1,1	47	126	220	4300	7000	<b>7219 ATBP4DF</b>	5,303
<b>100</b>	150	24	1,5	0,6	29	122	154	6700	11000	<b>7020 CTAP4DT</b>	2,603
	150	24	1,5	0,6	29	122	154	5600	9500	<b>7020 CTAP4DB</b>	2,603
	150	24	1,5	0,6	29	122	154	5600	9500	<b>7020 CTAP4DF</b>	2,603
	150	24	1,5	0,6	41	115	146	5000	8500	<b>7020 AMBP4DT</b>	2,603
	150	24	1,5	0,6	29	163	231	4300	7000	<b>7020 AMBP4TBT</b>	3,903
	150	24	1,5	0,6	41	188	292	4000	6700	<b>7020 AMBP4QBT</b>	5,203
	150	24	1,5	0,6	41	115	146	4500	7500	<b>7020 AMBP4DB</b>	2,603
	150	24	1,5	0,6	41	115	146	5000	8500	<b>7020 AMBP4DT</b>	2,603
	150	24	1,5	0,6	41	115	146	4500	7500	<b>7020 AMBP4DB</b>	2,603
	150	24	1,5	0,6	41	115	146	4500	7500	<b>7020 AMBP4DF</b>	2,603
	150	24	1,5	0,6	41	115	146	4500	7500	<b>7020 AMBP4DF</b>	2,603
	180	34	2,1	1,1	36	243	254	5000	8500	<b>7220 CTAP4DT</b>	6,303
	180	34	2,1	1,1	36	243	254	4500	7500	<b>7220 CTAP4DB</b>	6,303
	180	34	2,1	1,1	36	243	254	4500	7500	<b>7220 CTAP4DF</b>	6,303
	180	34	2,1	1,1	36	398	508	4000	6700	<b>7220 CTAP4QBC</b>	12,63
	180	34	2,1	1,1	50	230	243	4500	7500	<b>7220 AMAP4DT</b>	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	<b>7220 AMAP4DB</b>	6,303
	180	34	2,1	1,1	50	230	243	4500	7500	<b>7220 ATAP4DT</b>	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	<b>7220 ATAP4DB</b>	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	<b>7220 ATAP4DF</b>	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	<b>7220 ATBP4DT</b>	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	<b>7220 ATBP4DB</b>	6,303
	180	34	2,1	1,1	50	230	243	4000	6700	<b>7220 ATBP4DF</b>	6,303
<b>105</b>	160	26	2	1	31	143	178	4500	7500	<b>7021 CTAP4DB</b>	3,323
<b>110</b>	170	28	2	1	47	169	208	3800	6300	<b>7022 ATAP4DB</b>	6,403
<b>120</b>	180	28	2	2	49	169	210	3600	6000	<b>7024 AMAP4DB</b>	2,293
<b>130</b>	200	33	2	1	39	313	298	3800	6300	<b>7026 CMAP4TBT</b>	9,573
	200	33	2	1	39	235	298	4000	6700	<b>7026 CTAP4DB</b>	6,383
<b>150</b>	225	35	2,1	1,1	61	258	346	2800	4500	<b>7030 AMAP4DB</b>	8,643



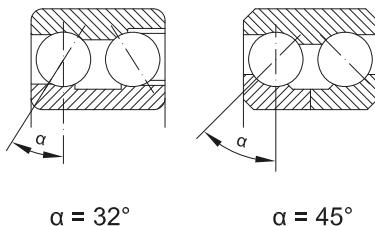
# Angular contact ball bearings, double row

Double row angular contact ball bearings are, functionally, similar to two single row angular contact ball bearings in DB arrangement and they have to take axial loads acting in both directions and tilting moments.

Double row angular contact ball bearings are narrower than a pair of single row angular contact ball bearings.

Double row angular contact ball bearings can be manufactured in two versions:

- with non-separable inner ring, series 32 and 33, with a contact angle  $\alpha = 32^\circ$ ;
- with separable inner ring, series 33D, with a contact angle  $\alpha = 45^\circ$ .



Double row angular contact ball bearings, series 32 and 33 have filling slots on one side. If these bearings have to take axial loads mainly in one direction, they are to be mounted so that axial loads acting upon the shaft should be directed to the filling slots.

Double row angular contact ball bearings series 33D are suitable to accomodate heavy axial loads in both directions.

## Dimensions

Main bearing dimensions given in tables are in accordance with ISO/R15.

## Misalignment

Angular misalignment of the outer ring, relative to the inner ring, is accommodated by force between the balls and raceway. This leads to a shortening of bearing life.

## Tolerances

Double row angular contact ball bearings are generally manufactured to the normal tolerance class.

Bearing tolerances are given on page 28.

## Axial clearance

Double row angular contact ball bearings series 32 and 33, with a contact angle  $\alpha = 32^\circ$  are generally manufactured with normal axial clearance. They can also be manufactured with smaller or larger axial clearances.

Double row angular contact ball bearings series 33D, with a contact angle  $\alpha = 45^\circ$  are generally mounted on the shaft with greater tightening than those of series 33. For this reason, the axial clearance is larger.

The values of axial clearance of the double row angular contact ball bearings are given in table 1.

## Cages

Double row angular contact ball bearings series 32, 33 are fitted with machined brass cages.

Glass fibre reinforced polyamide 6.6 cages are also used with good results.

Large-sized bearings are fitted with pressed sheet cages.

Cage design and some technical data are given in table 2.

## Equivalent dynamic radial load

For double row angular contact ball bearings series 32 and 33 with a contact angle  $\alpha = 32^\circ$ , the following equations are available:

$$P_r = F_r + 0,73 F_{a'} \text{ kN}, \quad \text{for } F_a/F_r \leq 0,86$$

$$P_r = 0,62 F_r + 1,17 F_{a'} \text{ kN}, \quad \text{for } F_a/F_r > 0,86$$

For double row angular contact ball bearings series 33D with a contact angle  $\alpha = 45^\circ$ , the following equations are used:

$$P_r = F_r + 0,47 F_{a'} \text{ kN}, \quad \text{for } F_a/F_r \leq 1,33$$

$$P_r = 0,54 F_r + 0,81 F_{a'} \text{ kN}, \quad \text{for } F_a/F_r > 1,33$$

For double row angular contact ball bearings with a contact angle  $\alpha = 40^\circ$ , the following equations are used:

$$P_r = F_r + 0,55 F_{a'} \text{ kN}, \quad \text{for } F_a/F_r \leq 1,14$$

$$P_r = 0,57 F_r + 0,93 F_{a'} \text{ kN}, \quad \text{for } F_a/F_r > 1,14$$

## Axial clearance of the double row angular contact ball bearings

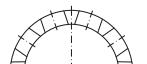
Table 1

Outer diameter d mm	Series 32 and 33				Series 33D						
	C2	Normal	C3	Normal	C3	Normal	C3	Normal			
over up to	min.	max.	min.	max.	min.	max.	min.	max.			
-	10	1	11	5	21	12	28	11	28	20	37
10	18	1	12	6	23	13	31	13	31	23	41
18	24	2	14	7	25	16	34	14	32	24	42
24	30	2	15	8	27	18	37	16	35	27	46
30	40	2	16	9	29	21	40	18	38	30	50
40	50	2	18	11	33	23	44	22	44	36	58
50	65	3	22	13	36	26	48	25	48	40	63
65	80	3	24	15	40	30	54	29	54	48	71
80	100	3	26	18	46	35	63	35	63	55	83
100	110	4	30	22	53	42	73	42	73	65	96

Radial clearance = 0,6 axial clearance

## Cages design and some technical data

Table 2

Cage	Design bearing	cage	Application	Max. value
			D <sub>m</sub> n oil	grease
Pressed sheet cage				- General application $450 \times 10^3$ $350 \times 10^3$ - Bearings series 32, 33
Polyamide cage TN				- General application $1000 \times 10^3$ $800 \times 10^3$ - Bearings series 32, 33
Machined brass cage M				- General application $800 \times 10^3$ $600 \times 10^3$ - Bearings dimensions 3319-3322, 3305D-3318D

## Equivalent static radial load

For double row angular contact ball bearings series 32 and 33 with a contact angle  $\alpha = 32^\circ$ :

$$P_{0r} = F_r + 0,63 F_a, \text{ kN}$$

For double row angular contact ball bearings series 33D with a contact angle  $\alpha = 45^\circ$ :

$$P_{0r} = F_r + 0,46 F_a, \text{ kN}$$

For double row angular contact ball bearings with a contact angle  $\alpha = 40^\circ$ :

$$P_{0r} = F_r + 0,52 F_a, \text{ kN}$$

## Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum radius  $r_u \text{ max.}$  should be less than bearing minimum mounting chamfer  $r_s \text{ min.}$

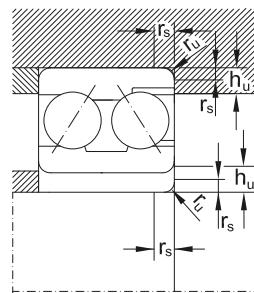
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connexion radii and support shoulder height are given in table 3.

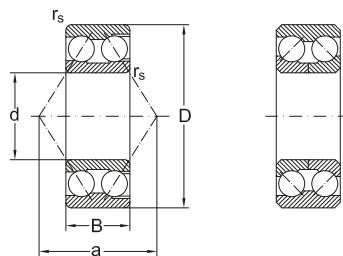
**Abutment dimensions**

Table 3

$r_s$ min.	$r_u$ max.	$h_u$ min.	Bearing series
mm			
<b>0,6</b>	0,6	2,1	
<b>1</b>	1	2,8	
<b>1,1</b>	1,1	3,5	
<b>1,5</b>	1,5	4,5	
<b>2</b>	2	5,5	
<b>2,1</b>	2,1	6	
<b>3</b>	2,5	7	



## Angular contact ball bearings, double row

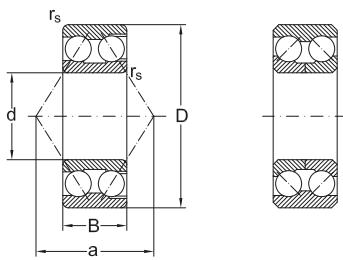


32;33

33D

Dimensions					Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
mm					kN		min <sup>-1</sup>		-	
<b>10</b>	30	14,3	0,6	19	7,8	3,9	16000	22000	<b>3200</b>	0,050
<b>12</b>	32	15,9	0,6	22	10,6	5,1	15000	20000	<b>3201</b>	0,060
<b>15</b>	35	15,9	0,6	23	11,8	6,1	13000	18000	<b>3202</b>	0,070
	42	19	1	27	16,3	8,7	10000	15000	<b>3302</b>	0,130
<b>17</b>	40	17,5	0,6	27	14,6	7,8	10000	15000	<b>3203</b>	0,100
	47	22,2	1	31	20,8	10,6	9500	14000	<b>3303</b>	0,190
<b>20</b>	47	20,6	1	31	19,6	10,8	9000	13000	<b>3204</b>	0,170
	52	22,2	1,1	34	23,2	12,9	8500	12000	<b>3304</b>	0,230
	52	22,2	1,1	46	24	11	8500	12000	<b>3304 D</b>	0,230
<b>25</b>	52	20,6	1	35	21,2	12,7	8000	11000	<b>3205</b>	0,190
	62	25,4	1,1	40	29,2	17,3	7500	10000	<b>3305</b>	0,370
	62	25,4	1,1	57	30	19	7500	10000	<b>3305 D</b>	0,380
<b>30</b>	62	23,8	1	41	28,1	18,3	7000	9500	<b>3206</b>	0,310
	72	30,2	1,1	47	38	24,5	6300	8500	<b>3306</b>	0,580
	72	30,2	1,1	67	41,5	30	6300	8500	<b>3306 D</b>	0,600
<b>35</b>	72	27	1,1	47	39	25	6000	8000	<b>3207</b>	0,480
	80	34,9	1,5	54	51	30	5600	7500	<b>3307</b>	0,780
	80	34,9	1,5	76	58	38	5600	7500	<b>3307 D</b>	0,780
<b>40</b>	80	30,2	1,1	52	48	31,5	5600	7500	<b>3208</b>	0,650
	90	36,5	1,5	58	62	39	5000	6700	<b>3308</b>	1,05
	90	36,5	1,5	84	70	45	5000	6700	<b>3308 D</b>	1,15
<b>45</b>	85	30,2	1,1	56	49	32,5	5000	6700	<b>3209</b>	0,700
	100	39,7	1,5	64	71	57	4500	6000	<b>3309</b>	1,41
	100	39,7	1,5	93	78	51	4500	6000	<b>3309 D</b>	1,61
<b>50</b>	90	30,2	1,1	59	51	36	4800	6300	<b>3210</b>	0,740
	110	44,4	2	73	85	75	4000	5300	<b>3310</b>	1,90
	110	44,4	2	102	90	72	4000	5300	<b>3310 D</b>	2,05
<b>55</b>	100	33,3	1,5	64	54	55	4300	5600	<b>3211</b>	1,05
	120	49,2	2	80	98	88	3600	4800	<b>3311</b>	2,48
	120	49,2	2	114	104	81,5	3600	4800	<b>3311 D</b>	2,68
<b>60</b>	110	36,5	1,5	71	69,5	72	3800	5000	<b>3212</b>	1,36
	130	54	2,1	86	114	112	3400	4500	<b>3312</b>	3,17
	130	54	2,1	123	116	104	3400	4500	<b>3312 D</b>	3,42
<b>65</b>	120	38,1	1,5	76	73,5	83	3600	4800	<b>3213</b>	1,76
	140	58,7	2,1	94	129	130	3200	4300	<b>3313</b>	4,01
	140	58,7	2,1	132	135	117	3200	4300	<b>3313 D</b>	4,31

## Angular contact ball bearings, double row



32;33                    33D

Dimensions					Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	a	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	Kg
mm					kN		$\text{min}^{-1}$		-	
<b>70</b>	125	39,7	1,5	81	81,5	91,5	3200	4300	<b>3214</b>	1,93
	150	63,5	2,1	101	143	146	2800	3800	<b>3314</b>	5,04
	150	63,5	2,1	142	159	130	2800	3800	<b>3314 D</b>	5,40
<b>75</b>	130	41,3	1,5	84	85	98	3200	4300	<b>3215</b>	2,08
	160	68,3	2,1	107	163	166	2600	3600	<b>3315</b>	6,16
	160	68,3	2,1	140	179	150	2600	3600	<b>3315 D</b>	6,66
<b>80</b>	140	44,4	2	91	95	110	2800	3800	<b>3216</b>	2,64
	170	68,3	2,1	112	176	186	2400	3400	<b>3316</b>	6,93
	170	68,3	2,1	149	192	170	2400	3400	<b>3316 D</b>	7,53
<b>85</b>	150	49,2	2	97	112	132	2600	3600	<b>3217</b>	3,39
	180	73	3	119	190	200	2200	3200	<b>3317</b>	8,30
	180	73	3	155	208	193	2200	3200	<b>3317 D</b>	9,00
<b>90</b>	160	52,4	2	104	125	146	2400	3400	<b>3218</b>	4,14
	190	73	3	125	216	240	2000	3000	<b>3318</b>	9,23
	190	73	3	166	228	216	2000	3000	<b>3318 D</b>	10,0
<b>95</b>	170	55,6	2,1	111	140	163	2200	3200	<b>3219</b>	5,00
	200	77,8	3	133	220	245	1900	2800	<b>3319</b>	11,4
<b>100</b>	180	60,3	2,1	118	160	196	2000	3000	<b>3220</b>	6,10
	215	82,6	3	139	240	280	1800	2600	<b>3320</b>	14,2
<b>110</b>	200	69,8	2,1	132	190	228	1900	2800	<b>3222</b>	8,79
	240	92,1	3	153	280	400	1800	2600	<b>3322</b>	19,0



# Four Point Contact Ball Bearings

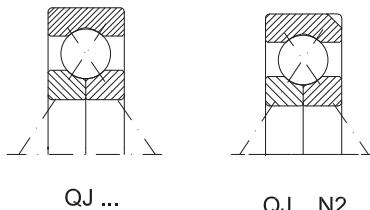
## Standards, Boundary dimensions

Standard plans	DIN 616
Single row angular contact ball bearings	
Four point contact ball bearings	DIN 628

## General

**Four Point Contact Ball Bearings** belong to the single row angular contact ball bearings family. But, unlike bearings of the series 7., four point contact bearings are double - acting. This means they are able to support thrust loads in either direction including minor radial loads.

**URB Four Point Contact Bearings** of the **QJ** design have **split inner rings** to allow the bearing to accept the maximum number of large balls. Due to the split inner rings these bearings are separable. This brings some mounting advantages. Because the bearing outer ring with cage and ball set, and the inner ring halves may be mounted separately.



## Design variants

**Four Point contact ball bearings** are frequently used to accomodate trust loads only.

To avoid unforeseen radial loading to the bearing they used to be mounted either reduced outside bearing ring diameters or to oversized housing seats.

To prevent the outer ring from rotating with the shaft, for point contact ball bearing outer rings are often produced with locating slots.

For this reason, **URB four point contact bearings** with outer diameters of more then  $\phi 160$  mm are produced with two locating slots in their outer ring (suffix **N2**).

Special series of four point contact ball bearings are available on request represented by the series **QJ 10** and four point contact ball bearings with split outer ring (Series **Q**).

## Misalignment

Four point contact ball bearings are less suitable to operate with misalignments.

When there are used in combination with a radial bearing as pure thrust bearings, however, they must not be exposed to any misalignment.

## Tolerances

**URB** four point contact ball bearings are produced to normal class tolerance (**PN**) as standard.

Other tolerance classes, such as **P6** or **P5** are available upon request.

## Cages

Unless otherwise specified, **URB** - four point contact ball bearings are fitted with machined solid brass cages (suffix **MPA**) as standard.

Also, other cage types and materials are produced to order; Machined steel solid cage (Suffix **F**) machined light metal alloy solid cage (Suffix **L**) moulded Polyamide cage (Suffix **TVP**).

## Internal clearance

**URB four point contact ball bearings** are produced to axial clearance group **CN** (Normal) as standard.

**URB** also produce four point contact ball bearings with enlarged (axial clearance groups **C3** or **C4**) and/or with reduced axial clearance (Clearance group **C2**) on request.

Values for these clearance groups are listed in **table below**.

*Internal axial clearance groups of **URB Four Point Contact Ball Bearings** (Clearances are in [ $\mu\text{m}$ ])*

Bore diameter [mm]		>	-	18	40	60	80	100	140	180	220
Clearance group	C2	min	20	30	40	50	60	70	80	100	120
Clearance group (NORMAL)	CN	min	50	60	80	90	100	120	140	160	180
Clearance group	C3	min	80	100	120	130	140	160	180	200	220
Clearance group	C4	min	115	135	155	165	185	205	225	250	275
		max	165	185	205	225	245	265	295	325	355

## Special clearance

For applications not covered by the standard clearances groups or where bearings with standard clearances do not achieve optimum perform, **URB** four point contact ball bearings may also be supplied with special internal clearances.

To function effectively, four point contact bearings should run under minimum bearing load of approximately **2 per cent** of the dynamic load rating ( $C_r$ ).

Example:

**A80.150**      Special axial internal clearance.  
Axial clearance of;  
**80 to 150 microns ( $\mu\text{m}$ )**

If required, the range of internal clearance values may be grouped to a specific part within a clearance group.

## Equivalent dinamic bearing load

In the case of four point contact ball bearings the following formula should be used:

when

$$F_a/F_r \leq 0,95 \text{ then } P = F_r + 0,66 * F_a$$

or, when

$$F_a/F_r > 0,95 \text{ then } P = 0,6 * F_r + 1,07 * F_a$$

Example:

**C2L**      axial clearance reduced to the  
**Lower part** of the **C2** clearance  
group.

## Minimum load

Four point contact ball bearings are suitable to operate at high speeds. For optimum contacting behaviours, however, four point contact ball bearings should be mainly exposed to axial acting loads.

An effective function is given, when

$$F_a \geq 1,27 * F_r$$

If this ratio is not attained or achieved high sliding friction may occur in the bearing and thus generate high noise and excessive wear.

## Equivalent static bearing load

$$P_0 = F_r + 0,58 * F_a$$

## Abutment and fillet dimensions

Four point contact ball bearings are often used to accommodate thrust loads, so they do require optimum support of the bearings rings by the machine components surrounding the bearing.

To gain adequate support the shaft and housing shoulders required a certain minimum height.

The bearing rings, however, must only contact adjacent parts with there side faces.

**URB**

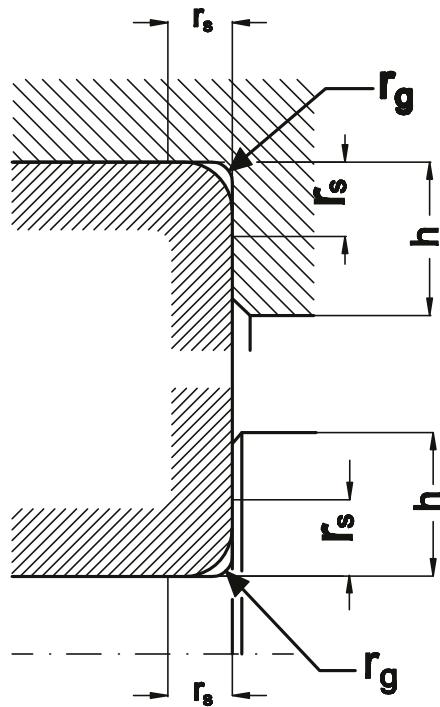
The radii of bearings corners must not touch the corner fillet radii of either the shaft or housing shoulders. Therefore, the largest fillet radius ( $r_g$  or  $r_{g1}$ , respectively) must always be smaller than the

minimum fillet dimensions of the bearing rings ( $r_s$ ). Recommendations for the dimensions of adjacent parts listed in **DIN 5418**, the values for the bearing fillet dimensions are stated in the bearing tables.

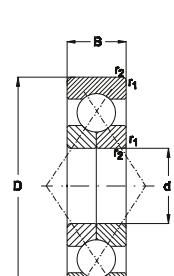
#### Abutment and fillet dimensions for Four Point contact Ball bearings

All dimensions are in [mm]

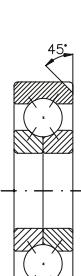
$r_s$ min	$r_g$ max	$h_{min}$ Bearing Series QJ 2.. QJ 3..
1,1	1	3,5
1,5	1,5	4,5
2	2	5,5
2,1	2,1	6
3	2,5	7
4	3	8,5
5	4	10



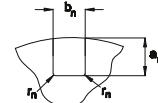
## Four Point Contact Ball Bearings



**QJ ...**



**QJ ...N2**



For  $D \geq 160$  mm  
standard design  
with 2 location  
slots in outer  
ring (N2)

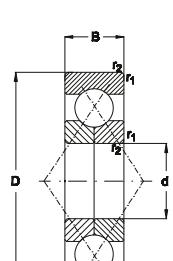
Dimensions	d	D	B	$r_1, r_2$ min.	a	$a_n$	$b_n$	$r_n$	Basical radial load		Speed limit		Designation	Mass
									C <sub>r</sub>	C <sub>0r</sub>	dyn.	stat.	grease	oil
mm														
<b>20</b>	52	15	1,1	26	-	-	-	-	30	19,6	10000	15000	<b>QJ304</b>	0,18
<b>25</b>	52	15	1	27	-	-	-	-	25,5	18,6	9500	14000	<b>QJ205</b>	0,17
	62	17	1	31	-	-	-	-	44	31,5	9500	13500	<b>QJ305</b>	0,25
<b>30</b>	62	16	1	32	-	-	-	-	36,5	27	8500	12000	<b>QJ206</b>	0,30
	72	19	1,1	36	-	-	-	-	58,5	43	7500	10000	<b>QJ306</b>	0,37
<b>35</b>	72	17	1,1	38	-	-	-	-	41,5	35,5	7500	10000	<b>QJ207</b>	0,46
	80	21	1,5	41	-	-	-	-	62	51	7000	9500	<b>QJ307</b>	0,50
<b>40</b>	80	18	1,1	42	-	-	-	-	54	45,5	6700	9000	<b>QJ208</b>	0,39
	90	23	1,5	46	-	-	-	-	86,5	68	6300	8500	<b>QJ308</b>	0,69
<b>45</b>	85	19	1,1	45	-	-	-	-	64	57	6300	8500	<b>QJ209</b>	0,48
	100	25	1,5	51	-	-	-	-	102	83	5600	7500	<b>QJ309</b>	0,95
<b>50</b>	90	20	1,1	49	-	-	-	-	58,5	56	5600	7500	<b>QJ210</b>	0,64
	110	27	2	56	-	-	-	-	110	91,5	5000	6700	<b>QJ310</b>	1,37
<b>55</b>	100	21	1,5	54	-	-	-	-	80	75	5300	7000	<b>QJ211</b>	0,68
	120	29	2	61	-	-	-	-	127	108	4500	6000	<b>QJ311</b>	1,74
<b>60</b>	110	22	1,5	60	-	-	-	-	91,5	93	4800	6300	<b>QJ212</b>	0,87
	130	31	2,1	67	-	-	-	-	146	127	4300	5600	<b>QJ312</b>	2,18
<b>65</b>	120	23	1,5	65	-	-	-	-	104	100	4300	5600	<b>QJ213</b>	1,24
	140	33	2,1	72	-	-	-	-	163	146	4000	5300	<b>QJ313</b>	2,69
<b>70</b>	125	24	1,5	68	-	-	-	-	118	132	4300	5600	<b>QJ214</b>	1,39
	150	35	2,1	77	-	-	-	-	183	166	3600	4800	<b>QJ314</b>	3,25
<b>75</b>	130	25	1,5	72	-	-	-	-	125	129	4000	5300	<b>QJ215</b>	1,77
	160	37	2,1	82	10,1	8,5	2	212	204	3400	4500	<b>QJ315 N2</b>	3,93	
<b>80</b>	140	26	2	77	-	-	-	-	132	137	3600	4800	<b>QJ216</b>	1,8
	170	39	2,1	88	10,1	8,5	2	220	216	3200	4300	<b>QJ316 N2</b>	4,61	

## Four Point Contact Ball Bearings

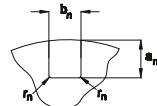
*Abutment and fillet  
dimensions see on  
page 198*

Dimensions	d	D	B	$r_1, r_2$ min.	a	$a_n$	$b_n$	$r_n$	Basical radial load		Speed limit		Designation	Mass		
									dyn.	$C_r$	stat.	$C_{0r}$				
mm									kN		$\text{min}^{-1}$		kg			
<b>85</b>	150	28	2	82	-	-	-	-	153	160	3400	4500	<b>QJ217</b>	2,25		
	180	41	3	93	11,7	10,5	2	245	255	3000	4000	<b>QJ317 N2</b>	5,49			
<b>90</b>	160	30	2	88	8,1	6,5	1	173	200	3200	4300	<b>QJ218 N2</b>	2,89			
	190	43	3	98	11,7	10,5	2	255	265	2800	3800	<b>QJ318 N2</b>	6,34			
<b>95</b>	170	32	2,1	93	8,1	6,5	1	196	228	3000	4000	<b>QJ219 N2</b>	3,37			
	200	45	3	103	11,7	10,5	2	285	310	2600	3600	<b>QJ319 N2</b>	7,4			
<b>100</b>	180	34	2,1	98	10,1	8,5	2	224	260	2800	3800	<b>QJ220 N2</b>	4,03			
	215	47	3	110	11,7	10,5	2	325	365	2400	3400	<b>QJ320 N2</b>	8,98			
<b>105</b>	190	36	2,1	103	10,1	8,5	2	232	260	2700	3700	<b>QJ221 N2</b>	6,11			
<b>110</b>	200	38	2,1	109	10,1	8,5	2	250	305	2400	3600	<b>QJ222 N2</b>	5,67			
	240	50	3	123	11,7	10,5	2	345	416	2000	3000	<b>QJ322 N2</b>	12,2			
<b>120</b>	215	40	2,1	117	11,7	10,5	2	285	360	2200	3200	<b>QJ224 N2</b>	6,74			
	260	55	3	133	11,7	10,5	2	380	480	1900	2800	<b>QJ324 N2</b>	15,6			
<b>130</b>	230	40	3	127	11,7	10,5	2	290	390	1900	2800	<b>QJ226 N2</b>	7,67			
	280	58	4	144	12,7	10,5	2	425	570	1800	2600	<b>QJ326 N2</b>	19,2			
<b>140</b>	250	42	3	137	11,7	10,5	2	315	415	1800	2600	<b>QJ228 N2</b>	9,69			
	300	62	4	154	12,7	10,5	2	475	655	1700	2400	<b>QJ328 N2</b>	23,2			
<b>150</b>	270	45	3	147	11,7	10,5	2	345	480	1700	2400	<b>QJ230 N2</b>	12,2			
	320	65	4	165	12,7	10,5	2	510	750	1600	2200	<b>QJ330 N2</b>	27,8			
<b>160</b>	290	48	3	158	12,7	10,5	2	375	530	1600	2200	<b>QJ232 N2</b>	20			
	340	68	4	175	12,7	10,5	2	585	865	1500	2100	<b>QJ332 N2</b>	32,5			
<b>170</b>	310	52	4	168	12,7	10,5	2	425	630	1600	2200	<b>QJ234 N2</b>	18,9			
	360	72	4	186	12,7	10,5	2	585	915	1400	1900	<b>QJ334 N2</b>	38,4			
<b>180</b>	320	52	4	175	12,7	10,5	2	430	670	1500	2000	<b>QJ236 N2</b>	23,1			
	380	75	4	196	12,7	10,5	2	680	1080	1300	1800	<b>QJ336 N2</b>	44,9			

## Four Point Contact Ball Bearings



**QJ ...**



**QJ ...N2**

For  $D \geq 160$  mm  
standard design  
with 2 location  
slots in outer  
ring (N2)

Dimensions							<b>Basical radial load</b> dyn.    stat. $C_r$ $C_{0r}$	Speed limit			<b>Designation</b>	<b>Mass</b> kg	
<b>d</b>	<b>D</b>	<b>B</b>	$r_1, r_2$ min.	<b>a</b>	<b><math>a_n</math></b>	<b><math>b_n</math></b>		dyn.	stat.	grease	oil		
mm													
<b>190</b>	340	55	4	186	12,7	10,5	2	465	750	1400	1900	<b>QJ238 N2</b>	24
<b>200</b>	360	58	4	196	12,7	10,5	2	510	850	1300	1800	<b>QJ240 N2</b>	33,3
<b>220</b>	400	65	4	217	12,7	10,5	2	630	1120	1250	1700	<b>QJ244 N2</b>	49,3
<b>240</b>	440	72	4	238	15	12,5	2,5	680	1270	1100	1500	<b>QJ248 N2</b>	68,3

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

202



203

URB

# Cylindrical roller bearings

Cylindrical roller bearings are manufactured in a various range of constructive types and sizes, particularly single row cylindrical roller bearings but also two or more row cylindrical roller bearings but also two or more row cylindrical roller bearings, with cages or roller by roller, as shown in the designs below.

In case of cylindrical roller bearings, the rollers are laterally guided by the fixed ribs of one ring.

In case of bearings with cages, the ring with ribs and the rollers retained in the cage can be drawn out from the other ring, which means that these bearings are dismountable.

- single row



NU



NJ



NUP



N



RNU

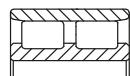


NJ+HJ

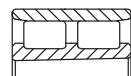


NU+HJ

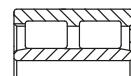
- double row



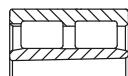
NN30



NN30K



NNU49



NNU49K



NCF V



NJ VH

- without cage (full complement)

- C3** - Radial clearance larger than normal, bearings with interchangeable elements
- C3NA** - Radial clearance larger than normal, bearings with non-interchangeable elements
- D** - Two-pieces inner ring
- E** - Cylindrical roller bearings, E - design (increased basic static and dynamic loads)
- F** - Machined steel or special cast iron cage
- F2** - Constructive modification

<b>K</b>	- Tapered bore bearing
<b>M</b>	- Machined brass cage guided on the rolling elements
<b>M6</b>	- Machined brass cage with integral rivets
<b>MA</b>	- Machined brass cage guided in the outer ring
<b>MA6</b>	- Machined brass cage with integral rivets guided on outer ring
<b>MB</b>	- Machined brass cage guided in the inner ring
<b>MPA</b>	- Machined brass cage (one-piece)
<b>N</b>	- Circular groove in the outer ring for snap ring
<b>NA</b>	- Radial clearance, non-interchangeable elements
<b>NR</b>	- Circular groove in the outer ring and snap ring
<b>P</b>	- Two-pieces outer ring
<b>P5</b>	- Tolerance class more accurate than normal (P6)
<b>P51</b>	- Tolerance class P5 and radial clearance C1
<b>P53</b>	- Tolerance class P5 and radial clearance C3
<b>P4</b>	- Tolerance class more accurate than P5
<b>P41</b>	- Tolerance class P4 and radial clearance C1
<b>R...</b>	- Non-standardized radial clearance (e.g. R45...85)
<b>TN</b>	- Polyamide cage
<b>V</b>	- Roller bearing without cage (full complement)
<b>VH</b>	- Self-retaining roller bearing without cage
<b>W20</b>	- Lubrication holes in the outer ring
<b>W518</b>	- Lubrication holes in the outer and inner ring
<b>W5</b>	- Lubrication groove and holes in both rings
<b>W513</b>	- Lubrication groove and holes in the outer ring and lubrication holes in the inner ring W513 = W33 + W26
<b>W7</b>	- Locating holes
<b>W8</b>	- Lubrication groove on the outer ring side surfaces
<b>W9</b>	- Lubrication groove on the inner ring side surfaces
<b>W20</b>	- Lubrication holes in the outer ring
<b>W33</b>	- Lubrication groove and holes on the outer ring
<b>W44</b>	- Lubrication groove and holes on the inner ring
<b>W339</b>	- W9 + W33
<b>ZS</b>	- NA radial clearance; changing the bearing elements, the clearance can be obtained from the interchangeable elements.

## Single or more rows cylindrical roller bearings

Single or more rows cylindrical roller bearings are manufactured by URB in various constructive versions, depending on the position of the ribs on rings. The four basic designs (NU, NJ, N and NUP) are given in the bearing tables.

Bearings of NU design have two fixed ribs on the outer ring and one smooth inner ring. Bearings of N design have two fixed ribs on the inner ring and one smooth outer ring. These designs allow an axial displacement in certain limits, of the shaft in relation to the housing. Therefore, these rolling bearings are used in non-locating bearing units.

Bearings of NJ design have two fixed ribs on the outer ring and a fixed rib on the inner ring which can guide the shaft in a single direction (axially).

Bearings of NUP design have also two fixed ribs on the outer ring and, on the inner ring, a fixed rib and a support washer. This way they can be used as locating bearings, guiding the shaft axially in both directions.

For a shaft guiding in a single direction, it also can be used a bearing of NU design which is combined with a support washer. Thus, the constructive version NUJ is obtained.

Support washers on both sides of a bearing of NU design are not allowed as they lead to an axial blocking of the rollers.

Cylindrical roller bearings can carry heavy radial loads and can operate at high speeds.

Double or more rows cylindrical roller bearings have small sections, high load carrying capacity and stiffness.

These bearings provide high stiffness and maximum load carrying capacity and are particularly used for tool holders of the machine-tools and rolling mills.

Double row cylindrical roller bearings series NNU49 and NN30 are generally manufactured to tolerance classes P5 and SP, used for machine tools.

Large-sized bearings series NNU49 are also manufactured to the normal tolerance class.

## Cylindrical roller bearings with snap ring groove

Single row cylindrical roller bearings are also manufactured with snap ring grooves on the outer rings. This design simplifies the bearing joint as the bearings are located into the housing by means of the snap rings. The snap ring groove and snap rings are in accordance with ISO 464, and tables 7 and 8 on page 89 and 91.

## Cylindrical roller bearings without cage (full complement)

These bearings incorporate the maximum number of rollers and have a small section in relation to their width.

This provides a high load carrying capacity and allows space-saving designs to be achieved.

Cylindrical roller bearings without cage cannot be used at speeds as high as those with cages. These bearings are manufactured with single or more row rollers and suffix V is added to the bearing designation. The most utilized bearings are those of series NCF29 V, NCF30 V and NJ23VH and they are given in this catalogue on page 259.

be avoided but also, in case of single row roller bearings, permits an angular misalignment of the outer ring with respect to the inner ring, depending on the bearing series and load according to the table 1.

Permissible misalignment		
Bearings series	Permissible misalignment	
	$P \leq 0,1 C_r$	$P > 0,1 C_r$
<b>NU10, NU2, NU3, NU4, NU2E, NU3E</b>	max. 3°	max. 7°
<b>NU22, NU23, NU22E, NU23E</b>	max. 2°	max. 4°
<b>N, NJ, NUP design, all series</b>	max. 2°	max. 4°

## Dimensions

The main dimensions of standardized bearings given in tables are in accordance with ISO 15.

## Misalignment

The modified contact between rollers and raceway allows not only peripheral stresses to

## Tolerances and radial clearance

Single row cylindrical roller bearings are usually manufactured to normal tolerance class with normal radial clearance.

They can also be manufactured to more accurate tolerance classes and with larger (C3NA and C4NA) or smaller (C1NA and C2NA) radial clearances.

Radial clearance for single and double row cylindrical roller bearings and needle roller bearings										
With interchangeable elements With cylindrical bore <sup>1)</sup>										
Bore diameter <i>d</i> over up to	Clearance group symbol									
	C2 min.	C2 max.	Normal min.	Normal max.	C3 min.	C3 max.	C4 min.	C4 max.	C5 min.	C5 max.
mm	µm									
24	0	25	20	45	35	60	50	75	65	90
24	30	0	25	20	45	35	60	50	75	70
30	40	5	30	25	50	45	70	60	85	105
40	50	5	35	30	60	50	80	70	100	95
50	65	10	40	40	70	60	90	80	10	110
65	80	10	45	40	75	65	100	90	125	130
80	100	15	50	50	85	75	110	105	140	155
100	120	15	55	50	90	85	125	125	165	180
120	140	15	60	60	105	100	145	145	190	200
140	160	20	70	70	120	115	165	165	215	225
160	180	25	75	75	125	120	170	170	220	250
180	200	35	90	90	145	140	195	195	250	275
200	225	45	105	105	165	160	220	220	280	305
225	250	45	110	110	175	170	235	235	300	330
250	280	55	125	125	195	190	260	260	330	370
280	315	55	130	130	205	200	275	275	350	410
315	355	65	145	145	225	225	305	305	385	455
355	400	100	190	190	280	280	370	370	460	510
400	450	110	210	210	310	310	410	410	510	565
450	500	110	220	220	330	330	440	440	550	625
500	560	120	240	240	360	360	480	480	600	660
560	630	140	260	260	380	380	500	500	620	675
630	710	145	285	285	425	425	565	565	705	795
710	800	150	310	310	470	470	630	630	790	845
800	900	180	350	350	520	520	690	690	860	950
900	1000	200	390	390	580	580	770	770	960	1150
1000	1120	220	430	430	640	640	850	850	1060	1270
1120	1250	230	470	470	710	710	950	950	1190	1430
1250	1400	270	530	530	790	790	1050	1050	1310	1570
1400	1600	330	610	610	890	890	1170	1170	1450	1730

1) Radial clearance for bearings with tapered bore is staggered with one group to the right, for example radial clearance C3 for cylindrical bore bearings match Normal radial clearance for tapered bore bearings.

Tolerances of cylindrical roller bearings are given on pages 28.

Radial clearances according to international standard ISO 5753 are given in tables 2 and 3 for cylindrical bore bearings both with interchangeable rings and with non-interchangeable rings (NA).

## Cages

Small and medium-sized single row cylindrical roller bearings are generally fitted with pressed sheet cages.

Large-sized bearings are fitted with machined brass cages of normal design, i.e. cages of separable design guided on rolling elements M, on the outside surface MA or inner surface MB.

In case of heavy loads and high speeds, cages are made in one piece.

Glass fibre reinforced polyamide 6.6 cages, are successfully used for small and medium-sized bearings, if the operating temperature doesn't exceed + 120°C. These cages have low mass, low coefficient of friction and are noiseless while running.

Cage design and some technical data are given in table 4.

**Radial clearance for single and double row cylindrical roller bearings and needle roller bearings**

With non-interchangeable elements

With cylindrical bore<sup>1)</sup>

Table 3

Bore diameter d over		Clearance group symbol											
		C1NA up to mm	C2NA min.	C2NA max.	NA min.	NA max.	C3NA min.	C3NA max.	C4NA min.	C4NA max.	C5NA min.	C5NA max.	
µm													
2,5	6	0	7	8	15	15	30	40	40	50			
6	10	0	7	10	20	20	35	45	45	55			
10	14	0	10	10	20	20	35	45	45	55			
14	24	5	15	10	20	20	35	45	45	55	65	75	
24	20	5	15	10	25	25	35	40	50	50	60	70	80
30	40	5	15	12	25	25	40	45	55	55	70	80	95
40	50	5	18	15	30	30	45	50	65	65	80	95	110
50	65	5	20	15	35	35	50	55	75	75	90	110	130
65	80	10	25	20	40	40	60	70	90	90	110	130	150
80	100	10	30	25	45	45	70	80	105	105	125	155	180
100	120	10	30	25	50	50	95	120	120	145	180	205	
120	140	10	35	30	60	60	90	105	135	135	160	200	230
140	160	10	35	35	65	65	100	115	150	150	180	225	260
160	180	10	40	35	75	75	110	125	165	165	200	250	285
180	200	15	45	40	80	80	120	140	180	180	220	275	315
200	225	15	50	45	90	90	135	155	200	200	240	305	350
225	250	15	50	50	100	100	150	170	215	215	265	330	380
250	280	20	55	55	110	110	165	185	240	240	295	370	420
280	315	20	60	60	120	120	180	205	265	265	325	410	470
315	355	20	65	65	135	135	200	225	295	295	360	455	520
355	400	25	75	75	150	150	225	255	330	330	405	510	585
400	450	25	85	85	170	170	255	285	370	370	455	565	650
450	500	25	95	95	190	190	285	315	410	410	505	625	720
500	560	25	100	105	210	210	315	350	455	455	560	720	815
560	630	30	110	115	230	230	345	390	505	505	620	800	910
630	710	30	130	130	260	260	390	435	565	565	695	900	1030
710	800	35	140	145	290	290	435	485	630	630	775	1000	1140
800	900	35	160	160	320	320	480	540	700	700	860	1130	1290
900	1000	35	180	180	360	360	540	600	780	780	960	1270	1440
1000	1120	50	200	200	400	400	600	660	860	860	1060	1380	1560
1120	1250	60	220	220	440	440	660	730	950	950	1170	1520	1720
1250	1400	60	240	240	480	480	720	810	1050	1050	1290	1680	1900
1400	1600	70	270	270	540	540	810	910	1190	1190	1460	1900	2150

1) Radial clearance for bearings with tapered bore is staggered with one group to the right, for example radial clearance C3NA for cylindrical bore bearings match radial clearance NA for tapered bore bearings.

## Minimum load

Cylindrical roller bearings must be subjected to a given minimum load, so that a proper operation of these bearings can be guaranteed.

This is necessary especially as the bearings are operated at high speeds and the centrifugal

forces produce additional friction in bearing due to the sliding between rollers and raceway.

The values of the minimum load can be enough accurately calculated using the equation:

$$F_{rm} = 0,02 C_r \text{ kN}$$

Cage design and some technical data

Table 4

Cage	Design bearing	Cage	Application	Max. value $D_{mn}$ oil grease
Pressed sheet cage with fins			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings NU, NJ, NUP</li> </ul>	$550 \times 10^3$ $400 \times 10^3$
Pressed sheet cage with fins			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings N</li> </ul>	$550 \times 10^3$ $400 \times 10^3$
Pressed sheet cage			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings construction E type NU, NJ, NUP</li> </ul>	$550 \times 10^3$ $400 \times 10^3$
Pressed sheet cage with fins			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings NU, NJ, NUP</li> </ul>	$550 \times 10^3$ $400 \times 10^3$
Two piece machined cage with integral rivets M6, MA6			<ul style="list-style-type: none"> <li>- General application</li> <li>- Heavy loads</li> <li>- Moderate and high speeds</li> </ul>	$1200 \times 10^3$ $900 \times 10^3$
Polyamide cage TN			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low frictional moment</li> <li>- High speeds</li> <li>- Low noise</li> <li><math>T &lt; 120^\circ \text{C}</math></li> </ul>	$1400 \times 10^3$ $1100 \times 10^3$
Two piece machined riveted cage M, MA, MB			<ul style="list-style-type: none"> <li>- General application</li> <li>- Heavy loads</li> <li>- Moderate and high speeds</li> <li>- Bearings with <math>d &gt; 100 \text{ mm}</math></li> </ul>	$1200 \times 10^3$ $900 \times 10^3$
One piece machined brass cage MPA			<ul style="list-style-type: none"> <li>- General application</li> <li>- Heavy loads</li> <li>- Provides proper lubrication</li> <li>- High speeds</li> </ul>	$1400 \times 10^3$ $1100 \times 10^3$

## Equivalent dynamic radial load

For cylindrical roller bearings purely radially loaded which don't locate shafts axially, equivalent dynamic load is:

$$P_r = F_r \text{ kN}$$

If cylindrical roller bearings have ribs on the outer and inner rings and locate shafts axially in one or both directions, equivalent dynamic load can be calculated using the equations:

$$\begin{aligned} P_r &= F_r \text{ kN,} & \text{when } F_a/F_r \leq e \\ P_r &= 0,92 F_r + Y F_a \text{ kN,} & \text{when } F_a/F_r > e \end{aligned}$$

where:

e - calculation factor with values:

- 0,2 for series 10,2,3 and 4
- 0,3 for series 22,23

Y - factor for axial load

- 0,6 for series 10,2,3 and 4
- 0,4 for series 22,23

Cylindrical roller bearings axially loaded run satisfactorily only if they are simultaneously radially loaded. Ratio  $F_a/F_r$  should not exceed 0,5 for bearings of E design and 0,4 for the other bearings.

## Equivalent static radial load

For cylindrical roller bearings purely radially loaded, equivalent static load is:

$$P_{or} = F_r \text{ kN}$$

## Dynamic axial load

Bearings with ribs on the outer ring can accommodate axial loads in addition to radial loads. The axial load carrying capacity of cylindrical roller bearings do not depend essentially on the steel fatigue strength, but on the resistance of the sliding surfaces at the roller end and rib contact and therefore on lubrication, operating temperature and bearing thermal conductivity.

Considering the above mentioned, axial load carrying capacity of a cylindrical roller bearing can be enough accurately calculated using the following equation:

$$F_{amax} = \frac{k_1 C_{or} 10^4}{n(d+D)} - k_2 F_r,$$

where:

$F_{amax}$	- maximum permissible axial load, kN
$C_{or}$	- radial static load, kN
$F_r$	- radial load component, kN
$n$	- operating speed, r/min
$d$	- bearing bore diameter, mm
$D$	- bearing outside diameter, mm
$k_1$	- auxiliary factor, see table 5
$k_2$	- auxiliary factor, see table 5

The above equation is based on conditions which are considered typical for normal bearing operation:

- a difference of 60°C between the bearing operating temperature and the ambient temperature
- a specific heat loss from the bearing of 0,5 mW/mm<sup>2</sup>°C
- a viscosity ratio  $k=2$ .

The viscosity ratio  $k$  is the ratio of the actual viscosity at the operating temperature to the requisite viscosity for a proper lubrication at that temperature. Further details can be found in subchapter "Adjusted rating life", life adjustment factor  $a_{23}$  - on page 22.

In case of grease lubrication, the base oil viscosity of the grease should be used. These effects can be reduced at low speeds by using oils with EP additives.

Factors  $k_1$  and  $k_2$

Table 5

Factor	Lubrication	
	oil	grease
<b>Bearings construction E</b>	1,5 0,15	1 0,1
<b>Other bearings</b>	0,5 0,05	0,3 0,03

The values of permissible axial load  $F_{amax}$  obtained from the equation above mentioned are valid for a continuously acting constant axial load. If axial loads act only for short periods, the values may be multiplied by 2 or for shock loads by 3.

The constantly acting axial load  $F_{amax}$  (N) should never exceed the numerical value of  $1,2 D^2$  ( $D$  = bearing outside diameter, mm) and occasional shock loads should never be greater than the numerical value of  $3D^2$ .

In case of heavy axial loads ( $F_a > D^2$ ), the ribs of the outer and inner ring respectively are

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recommended to be supported by the bearing adjoint parts. Bearings of NUP and NJ+HJ designs which take axial loads in both directions are to be placed so that main axial loads should be taken by fixed ribs, if bearing design allows.

### Heat treatment

Cylindrical roller bearings with outside diameter  $D > 240$  mm of all series given in the catalogue are to be subject to a heat treatment of stress relieving which allows bearings to be operated up to a temperature of  $+150^\circ\text{C}$ .

The hardness of rigs should not be less 59 HRC. Small-sized bearings operate normally up to  $+120^\circ\text{C}$ .

### Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft (housing) maximum radius  $r_{u \max}$  should be less than bearing minimum mounting chamfer  $r_{s \min}$ .

Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

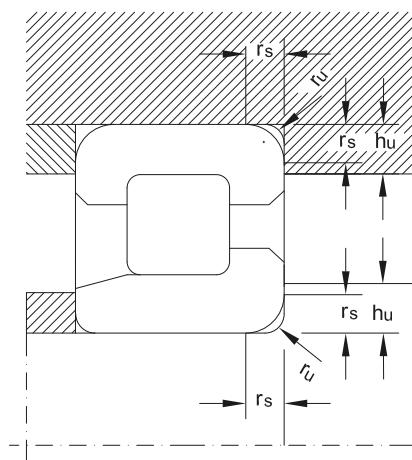
The values of the connection radius and support shoulder height are given in table 6.

Abutment dimensions for single row cylindrical roller bearings are given in table 7. The values for double row cylindrical roller bearings are given in table 8.

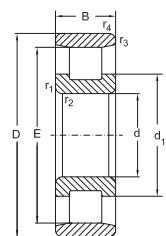
### Abutment dimensions

Table 6

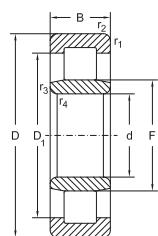
	$r_s$ , $r_{1s}$	$r_u$	$h_u$	
	min.	max.	min.	
Bearing series				
	10, 18, 19,		2, 2E, 3, 3E,	4
	28, 29, 30,		22, 22E, 23,	
	48, 49, 60		23E	
mm				
<b>0,3</b>	0,3	1	1,2	
<b>0,6</b>	0,6	1,6	2,1	
<b>1</b>	1	2,3	2,8	
<b>1,1</b>	1	3	3,5	4,5
<b>1,5</b>	1,5	3,5	4,5	5,5
<b>2</b>	2	4,4	5,5	6,5
<b>2,1</b>	2,1	5,1	6	7
<b>3</b>	2,5	6,2	7	8
<b>4</b>	3	7,3	8,5	10
<b>5</b>	4	9	10	12



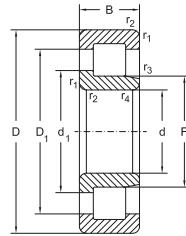
## Single Row Cylindrical Roller Bearings



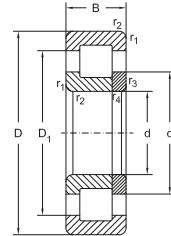
N



NU



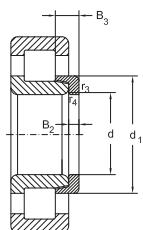
NJ



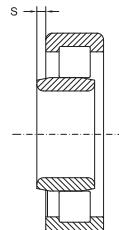
NUP

d	D	B	Dimensions			s ≈	Basical radial load		Speed limit		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$		stat. $C_{0r}$		grease	oil	
mm											
15	35	11	0,6	0,3	1	12,7	10,4	18000	22000	NU202 E	
	35	11	0,6	0,3	-	12,7	10,4	18000	22000	NJ202 E	
17	40	12	0,6	0,3	1,2	11,8	9,6	15000	18000	N203	
	40	12	0,6	0,3	1,2	17,6	14,6	15000	18000	NU203 E	
	40	12	0,6	0,3	-	17,6	14,6	15000	18000	NJ203 E	
	40	12	0,6	0,3	-	17,6	14,6	15000	18000	NUP203 E	
	40	16	0,6	0,3	1,0	24	22	15000	18000	NU2203 E	
	40	16	0,6	0,3	-	24	22	15000	18000	NJ2203 E	
	40	16	0,6	0,3	-	24	22	15000	18000	NUP2203 E	
	47	14	1,1	0,6	1,2	16,2	13	13000	16000	NU303 M	
	47	14	1,1	0,6	-	16,2	13	13000	16000	NJ303 M	
	47	14	1,1	0,6	-	16,2	13	13000	16000	NUP303 M	
20	47	14	1	0,6	1	15,4	12,7	13000	16000	N204	
	47	14	1	0,6	1	27,5	24,5	13000	16000	NU204 E	
	47	14	1	0,6	-	27,5	24,5	13000	16000	NJ204 E	
	47	14	1	0,6	-	27,5	24,5	13000	16000	NUP204 E	
	47	18	1	0,6	1,8	32,5	31	13000	16000	NU2204 E	
	47	18	1	0,6	-	32,5	31	13000	16000	NJ2204 E	
	47	18	1	0,6	-	32,5	31	13000	16000	NUP2204 E	
	52	15	1	0,6	1,1	31,5	27	11000	14000	NU304 E	
	52	15	1	0,6	-	31,5	27	11000	14000	NJ304 E	

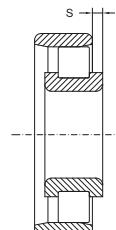
## Single Row Cylindrical Roller Bearings



NJ+HJ



S

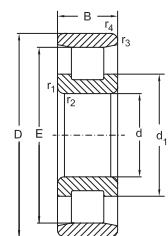


S

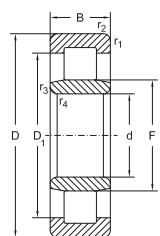
*Abutment and fillet dimensions see on page 210*

d	E	F	Dimensions			B <sub>2</sub>	B <sub>3</sub>	Thrust collar	Mass	
			d <sub>1</sub> ≈	D <sub>1</sub> ≈	B <sub>1</sub>				Bearing	Thrust collar
kg										
<b>15</b>	-	19,3	-	27,8	-	-	-	-	0,047	-
	-	19,3	21,8	27,8	2,5	5	HJ202 E	0,047	0,007	
<b>17</b>	33,9	-	24,7	-	-	-	-	-	0,068	-
	-	22,1	-	32	-	-	-	-	0,068	-
	-	22,1	24,7	32	3	5,5	HJ203 E	0,068	0,009	
	-	22,1	24,7	32	-	-	-	-	0,068	-
	-	22,1	-	32	-	-	-	-	0,091	-
	-	22,1	24,7	32	3	6	HJ2203 E	0,091	0,01	
	-	22,1	24,7	32	-	-	-	-	0,091	-
	-	25,1	-	36,8	-	-	-	-	0,120	-
	-	25,1	27,6	36,8	4	6,5	HJ303 E	0,120	0,012	
	-	25,1	27,6	36,8	-	-	-	-	0,120	-
<b>20</b>	40	-	29,9	-	-	-	-	-	0,132	-
	-	26,5	-	38,8	-	-	-	-	0,132	-
	-	26,5	29,9	38,8	3	5,5	HJ204 E	0,132	0,011	
	-	26,5	29,9	38,8	-	-	-	-	0,132	-
	-	26,5	-	38,4	-	-	-	-	0,142	-
	-	26,5	29,9	38,4	3	6,5	HJ2204	0,142	0,012	
	-	26,5	29,9	38,4	-	-	-	-	0,142	-
	-	27,5	-	41,8	-	-	-	-	0,151	-
	-	27,5	31,4	41,8	4	6,5	HJ304 E	0,151	0,017	

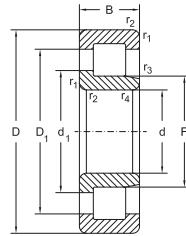
## Single Row Cylindrical Roller Bearings



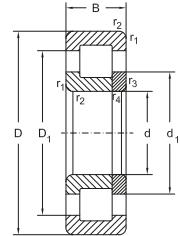
N



NU



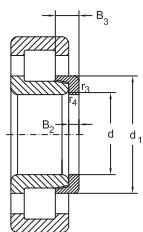
NJ



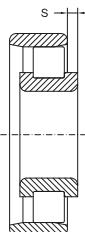
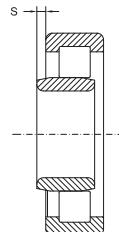
NUP

d mm	D mm	B mm	Dimensions			Basical radial load		Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	s ≈	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>	
mm										
<b>20</b>	52	15	1,1	0,6	-	31,5	27	11000	14000	<b>NUP304 E</b>
	52	21	1,1	0,6	2	41,5	39	11000	14000	<b>NU2304 E</b>
	52	21	1,1	0,6	-	41,5	39	11000	14000	<b>NJ2304 E</b>
	52	21	1,1	0,6	-	41,5	39	11000	14000	<b>NUP2304 E</b>
<b>25</b>	52	15	1	0,6	1,3	17,7	15,7	12000	15000	<b>N205</b>
	52	15	1	0,6	1,3	29	27,5	12000	15000	<b>NU205 E</b>
	52	15	1	0,6	-	29	27,5	12000	15000	<b>NJ205 E</b>
	52	15	1	0,6	-	29	27,5	12000	15000	<b>NUP205 E</b>
	52	18	1	0,6	1,7	34,5	35	12000	15000	<b>NU2205 E</b>
	52	18	1	0,6	-	34,5	35	12000	15000	<b>NJ2205 E</b>
	52	18	1	0,6	-	34,5	35	12000	15000	<b>NUP2205 E</b>
	62	17	1,1	1,1	1,5	29,3	25,2	9500	12000	<b>N305</b>
	62	17	1,1	1,1	1,5	41,5	37,5	9500	12000	<b>NU305 E</b>
	62	17	1,1	1,1	-	41,5	37,5	9500	12000	<b>NJ305 E</b>
	62	17	1,1	1,1	-	41,5	37,5	9500	12000	<b>NUP305 E</b>
	62	24	1,1	1,1	1,9	57	56	9500	12000	<b>NU2305 E</b>
	62	24	1,1	1,1	-	57	56	9500	12000	<b>NJ2305 E</b>
	62	24	1,1	1,1	-	57	56	9500	12000	<b>NUP2305 E</b>
	80	21	1,5	1,5	2,2	50,6	44,4	8500	10000	<b>NU405 M</b>
	80	21	1,5	1,5	-	50,6	44,4	8500	10000	<b>NJ405 M</b>
<b>30</b>	62	16	1	0,6	1,4	39,7	37,9	9500	12000	<b>N206 EM6</b>

## Single Row Cylindrical Roller Bearings



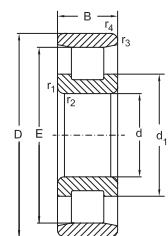
NJ+HJ



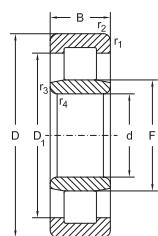
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar			Mass	
					$B_2$	$B_3$	Designation	Bearing	Thrust collar
kg									
20	-	27,5	31,4	41,8	-	-	-	0,150	-
	-	27,5	-	41,8	-	-	-	0,210	-
	-	27,5	31,4	41,8	4	7,5	HJ2304 E	0,210	0,019
	-	27,5	31,4	41,8	-	-	-	0,210	-
25	45	-	35	-	-	-	-	0,130	-
	-	31,5	-	43,3	-	-	-	0,140	-
	-	31,5	34,9	43,3	3	6	HJ205 E	0,140	0,015
	-	31,5	34,9	43,3	-	-	-	0,140	-
	-	31,5	-	43,3	-	-	-	0,160	-
	-	31,5	34,9	43,3	3	6,5	HJ2205 E	0,160	0,015
	-	31,5	34,9	43,3	-	-	-	0,160	-
	53	-	39	-	-	-	-	0,245	-
	-	34	-	50,1	-	-	-	0,245	-
	-	34	38,3	50,1	4	7	HJ305 E	0,245	0,025
	-	34	38,3	50,1	-	-	-	0,245	-
	-	34	-	50,1	-	-	-	0,350	-
30	-	34	38,3	50,1	4	8	HJ2305 E	0,350	0,027
	-	34	38,3	50,1	-	-	-	0,350	-
	-	38,8	-	58,4	-	-	-	0,625	-
	-	38,8	43,6	58,4	6	10,5	HJ405	0,625	0,057
55,5	-	41,4	-	-	-	-	-	0,210	-

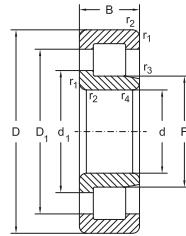
## Single Row Cylindrical Roller Bearings



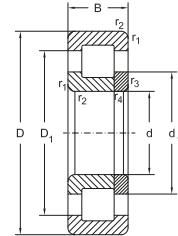
**N**



**NU**



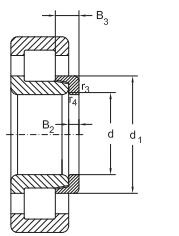
**NJ**



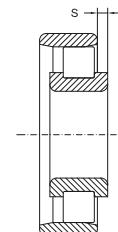
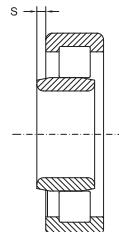
**NUP**

d mm	D mm	B mm	Dimensions			s $\approx$	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	s						
mm											
<b>30</b>	62	16	1	0,6	1,4	39,7	37,9	9500	12000	<b>NU206 E</b>	
	62	16	1	0,6	-	39,7	37,9	9500	12000	<b>NJ206 E</b>	
	62	16	1	0,6	-	39,7	37,9	9500	12000	<b>NUP206 E</b>	
	62	20	1	0,6	1,6	49	50	9500	12000	<b>NU2206 E</b>	
	62	20	1	0,6	-	49	50	9500	12000	<b>NJ2206 E</b>	
	62	20	1	0,6	-	49	50	9500	12000	<b>NUP2206 E</b>	
	72	19	1,1	1,1	1,9	38,6	35,2	8500	10000	<b>N306</b>	
	72	19	1,1	1,1	1,9	51	48	8500	10000	<b>NU306 E</b>	
	72	19	1,1	1,1	-	51	48	8500	10000	<b>NJ306 E</b>	
	72	19	1,1	1,1	-	51	48	8500	10000	<b>NUP306 E</b>	
	72	27	1,1	1,1	2,5	73,5	75	8500	10000	<b>NU2306 E</b>	
	72	27	1,1	1,1	-	73,5	75	8500	10000	<b>NJ2306 E</b>	
	72	27	1,1	1,1	-	73,5	75	8500	10000	<b>NUP2306 E</b>	
	90	23	1,5	1,5	2,3	65	57,8	7000	8500	<b>N406 M</b>	
	90	23	1,5	1,5	2,3	65	57,8	7000	8500	<b>NU406 M</b>	
	90	23	1,5	1,5	-	65	57,8	7000	8500	<b>NJ406 M</b>	
	90	23	1,5	1,5	-	65	57,8	7000	8500	<b>NUP406 M</b>	
<b>35</b>	62	14	1	0,6	2,6	23,6	24,5	10000	13000	<b>NU1007 M</b>	
	72	17	1,1	0,6	1,7	33,6	31,5	8500	10000	<b>N207</b>	
	72	17	1,1	0,6	1,7	50	50	8500	10000	<b>NU207 E</b>	
	72	17	1,1	0,6	-	50	50	8500	10000	<b>NJ207 E</b>	
	72	17	1,1	0,6	-	50	50	8500	10000	<b>NUP207 E</b>	
	72	23	1,1	0,6	2,9	65	70	8500	10000	<b>NU2207 E</b>	

## Single Row Cylindrical Roller Bearings



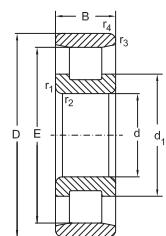
NJ+HJ



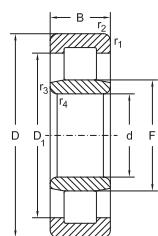
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar		Designation	Mass	
					$B_2$	$B_3$		Bearing	Thrust collar
kg									
30	-	37,5	-	52	-	-	-	0,210	-
	-	37,5	41,4	52	4	7	<b>HJ206 E</b>	0,210	0,025
	-	37,5	41,4	52	-	-	-	0,210	-
	-	37,5	-	52	-	-	-	0,260	-
	-	37,5	41,4	52	4	7,5	<b>HJ2206 E</b>	0,260	0,025
	-	37,5	41,4	52	-	-	-	0,260	-
	62	-	46,4	-	-	-	-	0,360	-
	-	40,5	-	58,3	-	-	-	0,370	-
	-	40,5	45,1	58,3	5	8,5	<b>HJ306 E</b>	0,370	0,043
	-	40,5	45,1	58,3	-	-	-	0,370	-
	-	40,5	-	58,3	-	-	-	0,528	-
	-	40,5	45,1	58,3	5	9,5	<b>HJ2306 E</b>	0,528	0,045
73	-	40,5	45,1	58,3	-	-	-	0,528	-
	-	50,5	-	-	-	-	-	0,870	-
	-	45	-	67,8	-	-	-	0,870	-
	-	45	50,5	67,8	7	11,5	<b>HJ406</b>	0,870	0,09
	-	45	50,5	67,8	-	-	-	0,870	-
	-	42	44,5	51,9	4	7,75	<b>HJ1007</b>	0,180	0,02
35	61,8	-	47,6	-	-	-	-	0,305	-
	-	44	-	60,1	-	-	-	0,305	-
	-	44	48	60,1	4	7	<b>HJ207 E</b>	0,305	0,033
	-	44	48	60,1	-	-	-	0,305	-
	-	44	-	60,1	-	-	-	0,395	-

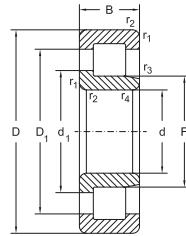
## Single Row Cylindrical Roller Bearings



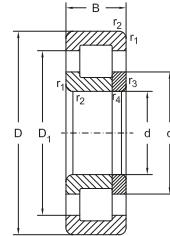
N



NU



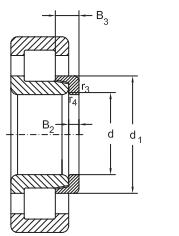
NJ



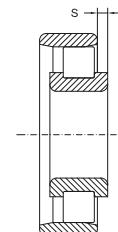
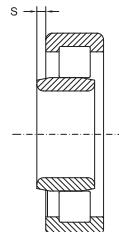
NUP

d mm	D mm	B mm	Dimensions			Basical radial load		Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	s ≈	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>	
mm										
<b>35</b>	72	23	1	0,6	2,9	65	70	8500	10000	<b>NJ2207 E</b>
	72	23	1	0,6	-	65	70	8500	10000	<b>NUP2207 E</b>
	80	21	1,1	1,5	0,6	44,3	40,4	7500	9000	<b>N307</b>
	80	21	1,1	1,5	0,6	66,7	65,4	7500	9000	<b>NU307 E</b>
	80	21	1,1	1,5	-	66,7	65,4	7500	9000	<b>NJ307 E</b>
	80	21	1,1	1,5	-	66,7	65,4	7500	9000	<b>NUP307 E</b>
	80	31	1,1	1,5	3	91,5	98	7500	9000	<b>NU2307 E</b>
	80	31	1,1	1,5	-	91,5	98	7500	9000	<b>NJ2307 E</b>
	80	31	1,1	1,5	-	91,5	98	7500	9000	<b>NUP2307 E</b>
	100	25	1,5	1,5	2,6	75	69,5	6300	7500	<b>N407 M</b>
	100	25	1,5	1,5	2,6	75	69,5	6300	7500	<b>NU407 M</b>
	100	25	1,5	1,5	-	75	69,5	6300	7500	<b>NJ407 M</b>
	100	25	1,5	1,5	-	75	69,5	6300	7500	<b>NUP407 M</b>
<b>40</b>	68	15	1	0,6	2,7	26,1	27,3	9500	12000	<b>NJ1008 M</b>
	80	18	1,1	1,1	1,9	43,7	42,9	7500	9000	<b>N208</b>
	80	18	1,1	1,1	1,9	53	53	7500	9000	<b>NU208 E</b>
	80	18	1,1	1,1	-	53	53	7500	9000	<b>NJ208 E</b>
	80	18	1,1	1,1	-	53	53	7500	9000	<b>NUP208 E</b>
	80	23	1,1	1,1	2,3	71	75	7500	9000	<b>NU2208 E</b>
	80	23	1,1	1,1	-	71	75	7500	9000	<b>NJ2208 E</b>
	80	23	1,1	1,1	-	71	75	7500	9000	<b>NUP2208 E</b>
	90	23	1,5	1,5	2,5	56,1	45,3	6300	7500	<b>N308</b>
	90	23	1,5	1,5	2,5	81,5	78	6300	7500	<b>NU308 E</b>

## Single Row Cylindrical Roller Bearings



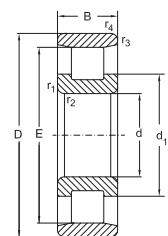
NJ+HJ



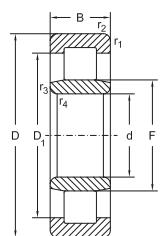
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar		Designation	Mass	
					$B_2$	$B_3$		Bearing	Thrust collar
kg									
35	-	44	48	60,1	4	8,5	HJ2207 E	0,395	0,035
	-	44	48	60,1	-	-	-	0,395	-
	68,2	-	51	-	-	-	-	0,47	-
	-	46,2	-	65,7	-	-	-	0,485	-
	-	46,2	51,2	65,7	6	9,5	HJ307 E	0,485	0,062
	-	46,2	51,2	65,7	-	-	-	0,485	-
	-	46,2	-	65,7	-	-	-	0,715	-
	-	46,2	51,2	65,7	6	11	HJ2307 E	0,715	0,065
	-	46,2	51,2	65,7	-	-	-	0,715	-
	83	-	59	-	-	-	-	1,05	-
	-	53	-	77,6	-	-	-	1,05	-
	-	53	59	77,6	8	13	HJ407	1,05	0,13
	-	53	59	77,6	-	-	-	1,05	-
40	-	47	50	57,6	4	8	HJ1008	0,23	0,03
	70	-	54,4	-	-	-	-	0,40	-
	-	49,5	-	67,3	-	-	-	0,38	-
	-	49,5	54,1	67,3	5	8,5	HJ208 E	0,38	0,05
	-	49,5	54,1	67,3	-	-	-	0,38	-
	-	49,5	-	67,3	-	-	-	0,49	-
	-	49,5	54,1	67,3	5	9	HJ2208 E	0,49	0,05
	-	49,5	54,1	67,3	-	-	-	0,49	-
	77,5	-	58,8	-	-	-	-	0,66	-
	-	52	-	74,9	-	-	-	0,65	-

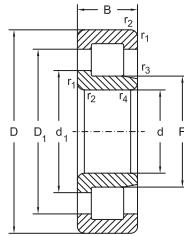
## Single Row Cylindrical Roller Bearings



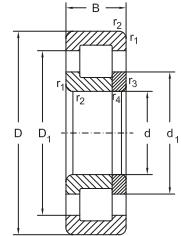
N



NU



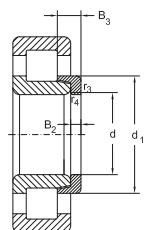
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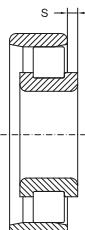
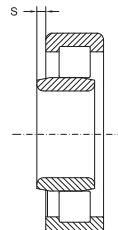
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load		Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	dyn. C <sub>r</sub>		stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
mm											
<b>40</b>	90	23	1,5	1,5	-	81,5	78	6300	7500	<b>NJ308 E</b>	
	90	23	1,5	1,5	-	81,5	78	6300	7500	<b>NUP308 E</b>	
	90	33	1,5	1,5	3,5	112	120	6300	7500	<b>NU2308 E</b>	
	90	33	1,5	1,5	-	112	120	6300	7500	<b>NJ2308 E</b>	
	90	33	1,5	1,5	-	112	120	6300	7500	<b>NUP2308 E</b>	
	110	27	2	2	2,6	93	86,5	5500	6800	<b>N408 M</b>	
	110	27	2	2	2,6	93	86,5	5500	6800	<b>NU408 M</b>	
	110	27	2	2	-	93	86,5	5500	6800	<b>NJ408 M</b>	
	110	27	2	2	-	93	86,5	5500	6800	<b>NUP408 M</b>	
<b>45</b>	75	16	1	0,6	2,5	32,5	35,5	8500	10000	<b>NU1009 M</b>	
	85	19	1,1	1,1	1,9	61	63	7000	8500	<b>N209 E</b>	
	85	19	1,1	1,1	1,9	61	63	7000	8500	<b>NU209 E</b>	
	85	19	1,1	1,1	-	61	63	7000	8500	<b>NJ209 E</b>	
	85	19	1,1	1,1	-	61	63	7000	8500	<b>NUP209 E</b>	
	85	23	1,1	1,1	2,3	76	81,6	7000	8500	<b>NU2209 E</b>	
	85	23	1,1	1,1	-	76	81,6	7000	8500	<b>NJ2209 E</b>	
	85	23	1,1	1,1	-	76	81,6	7000	8500	<b>NUP2209 E</b>	
	100	25	1,5	1,5	2,9	98	100	5600	6700	<b>N309 E</b>	
	100	25	1,5	1,5	2,9	98	100	5600	6700	<b>NU309 E</b>	
	100	25	1,5	1,5	-	98	100	5600	6700	<b>NJ309 E</b>	
	100	25	1,5	1,5	-	98	100	5600	6700	<b>NUP309 E</b>	
	100	36	1,5	1,5	3,5	137	153	5600	6700	<b>NU2309 E</b>	
	100	36	1,5	1,5	-	137	153	5600	6700	<b>NJ2309 E</b>	

## Single Row Cylindrical Roller Bearings



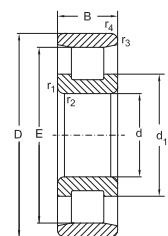
NJ+HJ



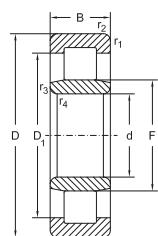
*Abutment and fillet dimensions see on page 210*

d	E	F	Dimensions				Designation	Thrust collar		Mass	
			d <sub>1</sub> ≈	D <sub>1</sub> ≈	B <sub>2</sub>	B <sub>3</sub>		Bearing	Thrust collar	kg	
<b>40</b>	-	52	57,7	74,9	7	11	<b>HJ308 E</b>	0,66	0,088		
	-	52	57,7	74,9	-	-	-	0,66	-		
	-	52	-	74,9	-	-	-	0,95	-		
	-	52	57,7	74,9	7	12,5	<b>HJ2308 E</b>	0,95	0,92		
	-	52	57,7	74,9	-	-	-	0,95	-		
	92	-	64,8	-	-	-	-	1,30	-		
	-	58	-	85,8	-	-	-	1,30	-		
	-	58	64,8	85,8	8	13	<b>HJ408</b>	1,30	0,15		
	-	58	64,8	85,8	-	-	-	1,30	-		
<b>45</b>	-	52,5	55,5	63,9	4	8,25	<b>HJ1009</b>	0,29	0,03		
	76,5	-	59,1	-	-	-	-	0,5	-		
	-	54,5	-	72,4	-	-	-	0,5	-		
	-	54,5	59,1	72,4	5	8,5	<b>HJ209 E</b>	0,5	0,05		
	-	54,5	59,1	72,4	-	-	-	0,5	-		
	-	54,5	-	72,4	-	-	-	0,6	-		
	-	54,5	59,1	72,4	5	9	<b>HJ2209 E</b>	0,6	0,057		
	-	54,5	59,1	72,4	-	-	-	0,6	-		
	88,5	-	64,6	-	-	-	-	1	-		
	-	58,5	-	83,1	-	-	-	1	-		
	-	58,5	64,6	83,1	7	11,5	<b>HJ309 E</b>	1	0,11		
	-	58,5	64,6	83,1	-	-	-	1	-		
	-	58,5	-	83,1	-	-	-	1,3	-		
	-	58,5	64,6	83,1	7	13	<b>HJ2309 E</b>	1,3	0,12		

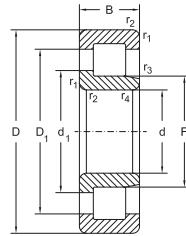
## Single Row Cylindrical Roller Bearings



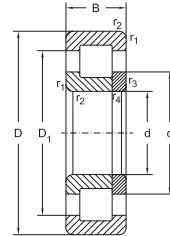
N



NU



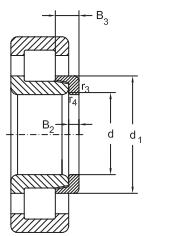
NJ



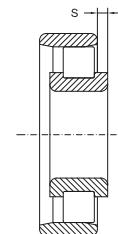
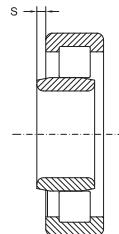
NUP

d mm	D mm	B mm	Dimensions			Basical radial load		Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	s ≈	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>	
mm										
<b>45</b>	100	36	1,5	1,5	-	137	153	5600	6700	<b>NUP2309 E</b>
	120	29	2	2	2,9	113	109	5000	6000	<b>N409 M</b>
	120	29	2	2	2,9	113	109	5000	6000	<b>NU409 M</b>
	120	29	2	2	-	113	109	5000	6000	<b>NJ409 M</b>
	120	29	2	2	-	113	109	5000	6000	<b>NUP409 M</b>
<b>50</b>	80	16	1	0,6	2,1	36	41,5	8000	9500	<b>NU1010 M</b>
	90	20	1,1	1,1	2,2	64	68	6700	8000	<b>N210 E</b>
	90	20	1,1	1,1	2,2	64	68	6700	8000	<b>NU210 E</b>
	90	20	1,1	1,1	-	64	68	6700	8000	<b>NJ210 E</b>
	90	20	1,1	1,1	-	64	68	6700	8000	<b>NUP210 E</b>
	90	23	1,1	1,1	2,2	78	88	6700	8000	<b>NU2210 E</b>
	90	23	1,1	1,1	-	78	88	6700	8000	<b>NJ2210 E</b>
	90	23	1,1	1,1	-	78	88	6700	8000	<b>NUP2210 E</b>
	110	27	2	2	3	110	114	5300	6300	<b>N310 E</b>
	110	27	2	2	3	110	114	5300	6300	<b>NU310 E</b>
	110	27	2	2	-	110	114	5300	6300	<b>NJ310 E</b>
	110	27	2	2	-	110	114	5300	6300	<b>NUP310 E</b>
	110	40	2	2	4,2	163	186	5300	6300	<b>NU2310 E</b>
	110	40	2	2	-	163	186	5300	6300	<b>NJ2310 E</b>
	110	40	2	2	-	163	186	5300	6300	<b>NUP2310 E</b>
	130	31	2,1	2,1	3	139	136	4500	5300	<b>N410 M</b>
	130	31	2,1	2,1	3	139	136	4500	5300	<b>NU410 M</b>
	130	31	2,1	2,1	-	139	136	4500	5300	<b>NJ410 M</b>

## Single Row Cylindrical Roller Bearings



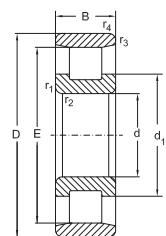
NJ+HJ



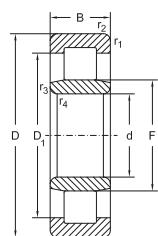
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar		Designation	Mass	
					$B_2$	$B_3$		Bearing	Thrust collar
kg									
45	-	58,5	64,6	83,1	-	-	-	1,3	-
	100,5	-	71,8	-	-	-	-	1,7	-
	-	64,5	-	93,9	-	-	-	1,7	-
	-	64,5	71,8	93,9	8	13,5	HJ409	1,7	0,19
	-	64,5	71,8	93,9	-	-	-	1,7	-
50	-	57,5	60,5	68,9	4	8,25	HJ1010	0,32	0,04
	81,5	-	64,1	-	-	-	-	0,6	-
	-	59,5	-	77,4	-	-	-	0,6	-
	-	59,5	64,1	77,4	5	9	HJ210 E	0,6	0,06
	-	59,5	64,1	77,4	-	-	-	0,6	-
	-	59,5	-	77,4	-	-	-	0,65	-
	-	59,5	64,1	77,4	5	9	HJ2210 E	0,65	0,06
	-	59,5	64,1	77,4	-	-	-	0,65	-
	97	-	71,4	-	-	-	-	1,2	-
	-	65	-	91,4	-	-	-	1,2	-
	-	65	71,4	91,4	8	13	HJ310 E	1,2	0,15
	-	65	71,4	91,4	-	-	-	1,2	-
	-	65	-	91,4	-	-	-	1,9	-
	-	65	71,4	91,4	8	14,5	HJ2310 E	1,9	0,16
	-	65	71,4	91,4	-	-	-	1,9	-
	110,8	-	78,8	-	-	-	-	2,1	-
	-	70,8	-	103,6	-	-	-	2,1	-
	-	70,8	78,8	103,6	9	14,5	HJ410	2,1	0,24

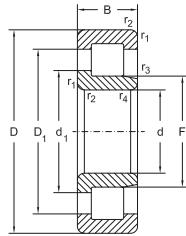
## Single Row Cylindrical Roller Bearings



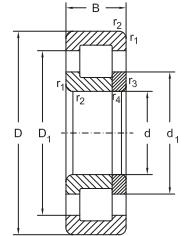
N



NU



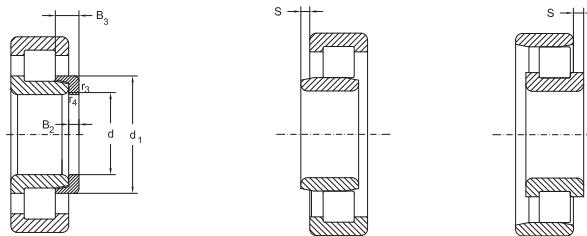
NJ



NUP

d	D	B	Dimensions			s ≈	Basical radial load		Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	dyn. C <sub>r</sub>		stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
mm											
50	130	31	2,1	2,1	-	139	136	4500	5300	<b>NUP410 M</b>	
55	90	18	1,1	1	2,4	41,5	50	7800	9200	<b>NU1011 M</b>	
	100	21	1,5	1,1	1,7	57,9	62,5	6300	7500	<b>N211</b>	
	100	21	1,5	1,1	1,7	83	95	6300	7500	<b>NU211 E</b>	
	100	21	1,5	1,1	-	83	95	6300	7500	<b>NJ211 E</b>	
	100	21	1,5	1,1	-	83	95	6300	7500	<b>NUP211 E</b>	
	100	25	1,5	1,1	2,2	98	118	6300	7500	<b>NU2211 E</b>	
	100	25	1,5	1,1	-	98	118	6300	7500	<b>NJ2211 E</b>	
	100	25	1,5	1,1	-	98	118	6300	7500	<b>NUP2211 E</b>	
	120	29	2	2	3	109	109	5000	6000	<b>N311</b>	
	120	29	2	2	3	134	140	5000	6000	<b>NU311 E</b>	
	120	29	2	2	-	134	140	5000	6000	<b>NJ311 E</b>	
	120	29	2	2	-	134	140	5000	6000	<b>NUP311 E</b>	
	120	43	2	2	4,3	187,3	212	5000	6000	<b>NU2311 EM</b>	
	120	43	2	2	-	187,3	212	5000	6000	<b>NJ2311 EM</b>	
	120	43	2	2	-	187,3	212	5000	6000	<b>NUP2311 EM</b>	
	140	33	2,1	2,1	3,3	140	137	4300	5000	<b>N411 M</b>	
	140	33	2,1	2,1	3,3	140	137	4300	5000	<b>NU411 M</b>	
	140	33	2,1	2,1	-	140	137	4300	5000	<b>NJ411 M</b>	
	140	33	2,1	2,1	-	140	137	4300	5000	<b>NUP411 M</b>	
60	95	18	1,1	1	3,3	44	55	6700	8000	<b>NU1012 M</b>	
	110	22	1,5	1,5	1,6	95	104	5600	6700	<b>N212 EM</b>	
	110	22	1,5	1,5	1,6	95	104	5600	6700	<b>NU212 E</b>	

## Single Row Cylindrical Roller Bearings

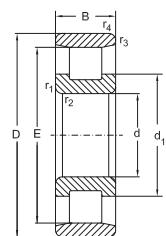


NJ+HJ

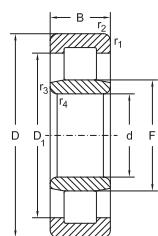
*Abutment and fillet dimensions see on page 210*

Dimensions	d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
								Designation	Bearing	Thrust collar	
	kg										
<b>50</b>	-	70,8	78,8	103,6	-	-	-	-	2,2	-	
<b>55</b>	-	64,5	67,5	76,7	5	10	HJ1011	0,47	0,05		
	88,5	-	71,3	-	-	-	-	0,655	-		
	-	66	-	85,6	-	-	-	0,75	-		
	-	66	71	85,6	6	9,5	HJ211 E	0,75	0,09		
	-	66	71	85,6	-	-	-	0,75	-		
	-	66	-	85,6	-	-	-	0,9	-		
	-	66	71	85,6	6	10	HJ2211 E	0,9	0,09		
	-	66	71	85,6	-	-	-	0,9	-		
	104,5	-	77,2	-	-	-	-	1,54	-		
	-	70,5	-	100,3	-	-	-	1,6	-		
	-	70,5	77,7	100,3	9	14	HJ3122 E	1,6	0,2		
	-	70,5	77,7	100,3	-	-	-	1,6	-		
	-	70,5	-	100,3	-	-	-	2,3	-		
	-	70,5	77,7	100,3	9	15,5	HJ2311 E	2,3	0,2		
	-	70,5	77,7	100,3	-	-	-	2,3	-		
<b>60</b>	-	69,5	72,5	81,7	5	10	HJ1012	0,49	0,06		
	100	-	77,7	-	-	-	-	0,887	-		
	-	72	-	95,1	-	-	-	1	-		

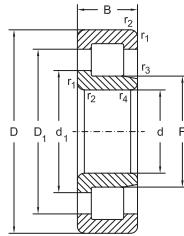
## Single Row Cylindrical Roller Bearings



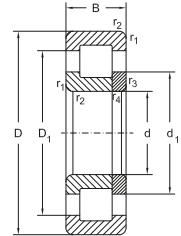
N



NU



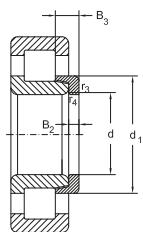
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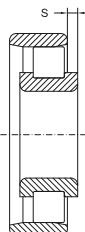
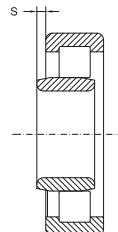
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load		Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	dyn. C <sub>r</sub>		stat. C <sub>0r</sub>		grease min <sup>-1</sup>	oil min <sup>-1</sup>	
mm											
<b>60</b>	110	22	1,5	1,5	-	95	104	5600	6700	<b>NJ212 E</b>	
	110	22	1,5	1,5	-	95	104	5600	6700	<b>NUP212 E</b>	
	110	28	1,5	1,5	2,4	129	153	5300	6300	<b>NU2212 E</b>	
	110	28	1,5	1,5	-	129	153	5300	6300	<b>NJ2212 E</b>	
	110	28	1,5	1,5	-	129	153	5300	6300	<b>NUP2212 E</b>	
	130	31	2,1	2,1	3	121	123	4500	5300	<b>N312</b>	
	130	31	2,1	2,1	3	150	156	4300	5000	<b>NU312 E</b>	
	130	31	2,1	2,1	-	150	156	4300	5000	<b>NJ312 E</b>	
	130	31	2,1	2,1	-	150	156	4300	5000	<b>NUP312 E</b>	
	130	46	2,1	2,1	4,2	224	260	4300	5000	<b>NU2312 E</b>	
	130	46	2,1	2,1	-	224	260	4300	5000	<b>NJ2312 E</b>	
	130	46	2,1	2,1	-	224	260	4300	5000	<b>NUP2312 E</b>	
	150	35	2,1	2,1	3,4	179	184	4000	4800	<b>N412 M</b>	
	150	35	2,1	2,1	3,4	179	184	4000	4800	<b>NU412 M</b>	
	150	35	2,1	2,1	-	179	184	4000	4800	<b>NJ412 M</b>	
	150	35	2,1	2,1	-	179	184	4000	4800	<b>NUP412 M</b>	
<b>65</b>	100	18	1,1	1	3,3	45	58,5	6600	7800	<b>NU1013 M</b>	
	120	23	1,5	1,5	1,4	80,5	89,7	5300	6300	<b>N213</b>	
	120	23	1,5	1,5	1,4	108	120	5300	6300	<b>NU213 E</b>	
	120	23	1,5	1,5	-	108	120	5300	6300	<b>NJ213 E</b>	
	120	23	1,5	1,5	-	108	120	5300	6300	<b>NUP213 E</b>	
	120	31	1,5	1,5	1,9	147	178	4800	5600	<b>NU2213 EM</b>	
	120	31	1,5	1,5	-	147	178	4800	5600	<b>NJ2213 EM</b>	

## Single Row Cylindrical Roller Bearings



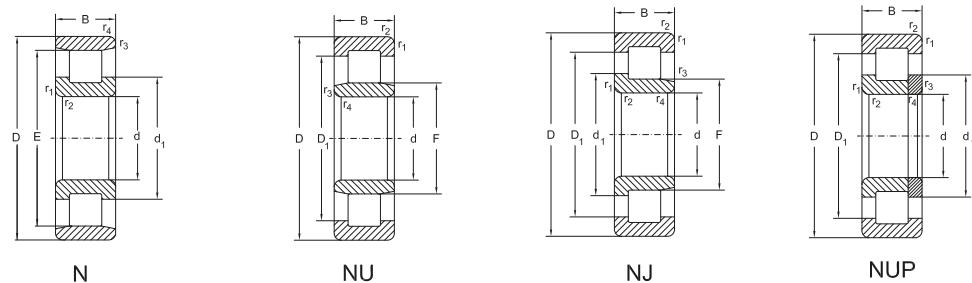
NJ+HJ



*Abutment and fillet dimensions see on page 210*

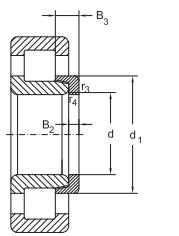
d	E	F	Dimensions				Designation	Thrust collar		Mass	
			$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$		Bearing	Thrust collar	kg	
<b>60</b>	-	72	77,7	95,1	6	10	<b>HJ212 E</b>	1	0,11		
	-	72	77,7	95,1	-	-	-	1	-		
	-	72	-	95,1	-	-	-	1,2	-		
	-	72	77,7	95,1	6	10	<b>HJ2212 E</b>	1,2	0,11		
	-	72	77,7	95,1	-	-	-	1,2	-		
	113	-	85	-	-	-	-	1,8	-		
	-	77	-	108,5	-	-	-	1,9	-		
	-	77	84,5	108,5	9	14,5	<b>HJ312 E</b>	1,9	0,24		
	-	77	84,5	108,5	-	-	-	1,9	-		
	-	77	-	108,5	-	-	-	2,9	-		
	-	77	84,5	108,5	9	16	<b>HJ2312 E</b>	2,9	0,24		
	-	77	84,5	108,5	-	-	-	2,9	-		
	127	-	91,8	-	-	-	-	3,1	-		
	-	83	-	118,8	-	-	-	3,1	-		
	-	83	91,8	118,8	10	16,5	<b>HJ412</b>	3,1	0,35		
	-	83	91,8	118,8	-	-	-	3,1	-		
<b>65</b>	-	74,5	77,5	86,7	5	10	<b>HJ1013</b>	0,52	0,07		
	105,6	-	85,4	-	-	-	-	1,06	-		
	-	78,5	-	103,2	-	-	-	1,2	-		
	-	78,5	84,6	103,2	6	10	<b>HJ213 E</b>	1,2	0,13		
	-	78,5	84,6	103,2	-	-	-	1,2	-		
	-	78,5	-	103,2	-	-	-	1,6	-		
	-	78,5	84,6	103,2	6	10,5	<b>HJ2213 E</b>	1,6	0,13		

## Single Row Cylindrical Roller Bearings

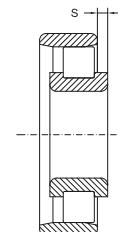
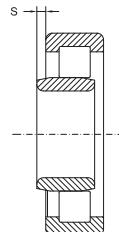


d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	s						
mm											
<b>65</b>	120	31	1,5	1,5	-	147	178	4800	5600	<b>NUP2213 EM</b>	
	140	33	2,1	2,1	1,4	170	176,8	4300	5000	<b>N313 EM</b>	
	140	33	2,1	2,1	1,4	180	190	4300	5000	<b>NU313 E</b>	
	140	33	2,1	2,1	-	180	190	4300	5000	<b>NJ313 E</b>	
	140	33	2,1	2,1	-	180	190	4300	5000	<b>NUP313 E</b>	
	140	48	2,1	2,1	3,9	245	285	4000	4800	<b>NU2313 EM</b>	
	140	48	2,1	2,1	-	245	285	4000	4800	<b>NJ2313 EM</b>	
	140	48	2,1	2,1	-	245	285	4000	4800	<b>NUP2313 EM</b>	
	160	37	2,1	2,1	3,5	195	203	3800	4500	<b>N413 M</b>	
	160	37	2,1	2,1	3,5	195	203	3800	4500	<b>NU413 M</b>	
	160	37	2,1	2,1	-	195	203	3800	4500	<b>NJ413 M</b>	
	160	37	2,1	2,1	-	195	203	3800	4500	<b>NUP413 M</b>	
<b>70</b>	110	20	1,1	1	3,3	65	81,5	6000	7000	<b>NU1014 M</b>	
	125	24	1,5	1,5	1,1	119	136	5000	6000	<b>N214 EM</b>	
	125	24	1,5	1,5	1,1	120	137	5000	6000	<b>NU214 E</b>	
	125	24	1,5	1,5	-	120	137	5000	6000	<b>NJ214 E</b>	
	125	24	1,5	1,5	-	120	137	5000	6000	<b>NUP214 E</b>	
	125	31	1,5	1,5	1,6	156	196	4800	5600	<b>NU2214 E</b>	
	125	31	1,5	1,5	-	156	196	4800	5600	<b>NJ2214 E</b>	
	125	31	1,5	1,5	-	156	196	4800	5600	<b>NUP2214 E</b>	
	150	35	2,1	2,1	1,6	149	156	4000	4800	<b>N314</b>	
	150	35	2,1	2,1	1,6	205	222	4000	4800	<b>NU314 E</b>	
	150	35	2,1	2,1	-	205	222	4000	4800	<b>NJ314 E</b>	

## Single Row Cylindrical Roller Bearings



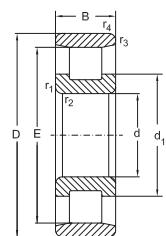
NJ+HJ



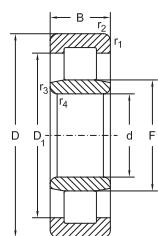
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
							Designation		Bearing	Thrust collar
										kg
65	-	78,5	84,6	103,2	-	-	-	-	1,6	-
	124,5	-	89	-	-	-	-	-	2,3	-
	-	82,5	-	117,4	-	-	-	-	2,3	-
	-	82,5	90,7	177,4	10	15,5	HJ313 E	2,3	0,29	
	-	82,5	90,7	117,4	-	-	-	2,3	-	
	-	82,5	-	117,4	-	-	-	3,7	-	
	-	82,5	89	118	10	18	HJ2313 E	3,7	0,3	
	-	82,5	89	118	-	-	-	3,7	-	
	135,3	-	98,5	-	-	-	-	3,8	-	
	-	89,3	-	126,9	-	-	-	3,8	-	
70	-	89,3	98,5	126,9	11	18	HJ413	3,8	0,43	
	-	89,3	98,5	126,9	-	-	-	3,8	-	
	-	80	84	95,3	5	10	HJ1014	0,75	0,08	
	113,5	-	88,8	-	-	-	-	1,3	-	
	-	83,5	-	108,2	-	-	-	1,3	-	
	-	83,5	89,6	108,2	7	11	HJ214 E	1,3	0,16	
	-	83,5	89,6	108,2	-	-	-	1,3	-	
	-	83,5	-	108,2	-	-	-	1,7	-	
	-	83,5	89,6	108,2	7	11,5	HJ2214 E	1,7	0,15	
	-	83,5	89,6	108,2	-	-	-	1,7	-	
130	-	98,9	-	-	-	-	-	2,68	-	
	-	89	-	125,6	-	-	-	2,8	-	
	-	89	97,5	125,6	10	15,5	HJ314 E	2,8	0,34	

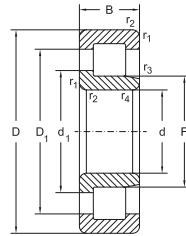
## Single Row Cylindrical Roller Bearings



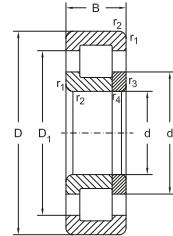
N



NU



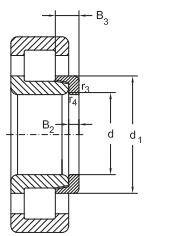
NJ



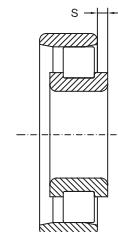
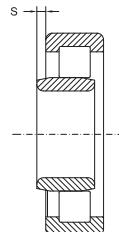
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.							
<b>70</b>	150	35	2,1	2,1	-	≈	205	222	4000	4800	<b>NUP314 E</b>
	150	51	2,1	2,1	4,6		275	325	3800	4500	<b>NU2314 E</b>
	150	51	2,1	2,1	-		275	325	3800	4500	<b>NJ2314 E</b>
	150	51	2,1	2,1	-		275	325	3800	4500	<b>NUP2314 E</b>
	180	42	3	3	4		240	253	3400	4000	<b>N414 M</b>
	180	42	3	3	4		240	253	3400	4000	<b>NU414 M</b>
	180	42	3	3	-		240	253	3400	4000	<b>NJ414 M</b>
	180	42	3	3	-		240	253	3400	4000	<b>NUP414 M</b>
<b>75</b>	115	20	1,1	1	2,5	≈	65,5	85	5600	6600	<b>NU1015 M</b>
	130	25	1,5	1,5	1,2		132	156	4800	5600	<b>N215 E</b>
	130	25	1,5	1,5	1,2		132	156	4800	5600	<b>NU215 E</b>
	130	25	1,5	1,5	-		132	156	4800	5600	<b>NJ215 E</b>
	130	25	1,5	1,5	-		132	156	4800	5600	<b>NUP215 E</b>
	130	31	1,5	1,5	1,6		151	190	4000	4800	<b>NU2215 EM</b>
	130	31	1,5	1,5	-		151	190	4000	4800	<b>NJ2215 EM</b>
	130	31	1,5	1,5	-		151	190	4000	4800	<b>NUP2215 EM</b>
	160	37	2,1	2,1	1,8		242	263	4000	4800	<b>N315 E</b>
	160	37	2,1	2,1	1,8		240	265	4000	4800	<b>NU315 E</b>
	160	37	2,1	2,1	-		240	265	4000	4800	<b>NJ315 E</b>
	160	37	2,1	2,1	-		240	265	4000	4800	<b>NUP315 E</b>
	160	55	2,1	2,1	4,1		329	395	4000	4800	<b>NU2315 E</b>
	160	55	2,1	2,1	-		329	395	4000	4800	<b>NJ2315 E</b>
	160	55	2,1	2,1	-		329	395	4000	4800	<b>NUP2315 E</b>

## Single Row Cylindrical Roller Bearings



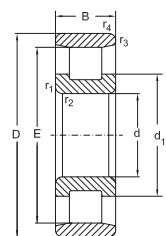
NJ+HJ



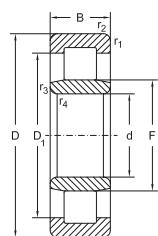
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar		Designation	Mass	
					$B_2$	$B_3$		Bearing	Thrust collar
kg									
70	-	89	97,5	125,6	-	-	-	2,8	-
	-	89	-	125,6	-	-	-	4,0	-
	-	89	97,5	125,6	10	18,5	HJ2314 E	4,0	0,35
	-	89	97,5	125,6	-	-	-	4,0	-
	152	-	110,3	-	-	-	-	5,5	-
	-	100	-	142	-	-	-	5,5	-
	-	100	110,3	142	12	20	HJ414	5,5	0,61
	-	100	110,3	142	-	-	-	5,5	-
75	-	85	89	100,9	5	10	HJ1015	0,75	0,09
	118,5	-	94,5	-	-	-	-	1,25	-
	-	88,5	-	113,2	-	-	-	1,25	-
	-	88,5	94,5	113,2	7	11	HJ215 E	1,25	0,17
	-	88,5	94,5	113,2	-	-	-	1,25	-
	-	88,5	-	113,2	-	-	-	1,6	-
	-	88,5	94,5	113,2	7	11,5	HJ2215 E	1,6	0,17
	-	88,5	94,5	113,2	-	-	-	1,6	-
	143	-	104,3	-	-	-	-	3,93	-
	-	95	-	135	-	-	-	3,4	-
	-	95	104,3	135	11	16,5	HJ315 E	3,4	0,42
	-	95	104,3	135	-	-	-	3,4	-
	-	95	-	135	-	-	-	5,0	-
	-	95	104,3	135	11	19,5	HJ2315 E	5,0	0,43
	-	95	104,3	135	-	-	-	5,0	-

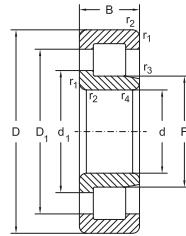
## Single Row Cylindrical Roller Bearings



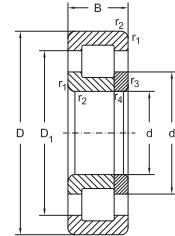
N



NU



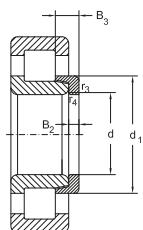
NJ



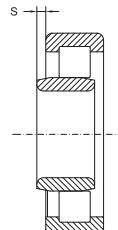
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{or}$	Speed limit		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.					grease	oil	
mm											
<b>75</b>	190	45	3	3	4,5		277	294	4000	4800	<b>N415 M</b>
	190	45	3	3	4,5		277	294	4000	4800	<b>NU415 M</b>
	190	45	3	3	-		277	294	4000	4800	<b>NJ415 M</b>
	190	45	3	3	-		277	294	4000	4800	<b>NUP415 M</b>
<b>80</b>	125	22	1,1	1	3,8	76,5	98	5200	6200		<b>NU1016 M</b>
	140	26	2	2	1,2	140	170	4300	5000		<b>N216 E</b>
	140	26	2	2	1,2	140	170	4300	5000		<b>NU216 E</b>
	140	26	2	2	-	140	170	4300	5000		<b>NJ216 E</b>
	140	26	2	2	-	140	170	4300	5000		<b>NUP216 E</b>
	140	33	2	2	2,5	186	245	4300	5000		<b>NU2216 EM</b>
	140	33	2	2		186	245	4300	5000		<b>NJ2216 EM</b>
	140	33	2	2		186	245	4300	5000		<b>NUP2216 EM</b>
	170	39	2,1	2,1	2,8	205	228	3600	4300		<b>N316</b>
	170	39	2,1	2,1	2,8	255	275	3600	4300		<b>NU316 E</b>
	170	39	2,1	2,1	-	255	275	3600	4300		<b>NJ316 E</b>
	170	39	2,1	2,1	-	255	275	3600	4300		<b>NUP316 E</b>
	170	58	2,1	2,1	3,6	352	424	3600	4300		<b>NU2316 EM</b>
	170	58	2,1	2,1	-	352	424	3600	4300		<b>NJ2316 EM</b>
	170	58	2,1	2,1	-	352	424	3600	4300		<b>NUP2316 EM</b>
	200	48	3	3	4,6	316	339	3000	3600		<b>N416 M</b>
	200	48	3	3	4,6	316	339	3000	3600		<b>NU416 M</b>
	200	48	3	3	-	316	339	3000	3600		<b>NJ416 M</b>
	200	48	3	3	-	316	339	3000	3600		<b>NUP416 M</b>

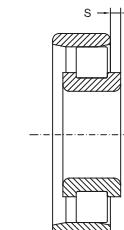
## Single Row Cylindrical Roller Bearings



NJ+HJ



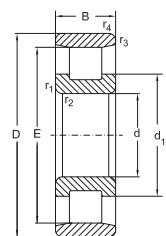
Thrust collar



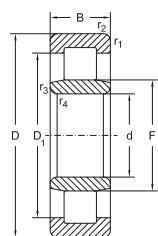
*Abutment and fillet dimensions see on page 210*

d	E	F	Dimensions			B <sub>3</sub>	Designation	Mass	
			d <sub>1</sub> ≈	D <sub>1</sub> ≈	B <sub>2</sub>			Bearing	Thrust collar
kg									
<b>75</b>	160,5	-	116	-	-	-	-	6,45	-
	-	104,5	-	149,8	-	-	-	6,45	-
	-	104,5	116	149,8	13	21,5	<b>HJ415</b>	6,45	0,71
	-	104,5	116	149,8	-	-	-	6,45	-
<b>80</b>	-	91,5	96	109,1	6	11,5	<b>HJ1016</b>	1,03	0,13
	-	127,3	-	101,7	-	-	-	1,54	-
	-	95,3	-	121,6	-	-	-	1,54	-
	-	95,3	101,7	121,6	8	12,5	<b>HJ216 E</b>	1,54	0,22
	-	95,3	101,7	121,6	-	-	-	1,54	-
	-	95,3	-	121,6	-	-	-	2,34	-
	-	95,3	101,7	121,6	8	12,5	<b>HJ2216 E</b>	2,4	0,22
	-	95,3	101,7	121,6	-	-	-	2,52	-
	147	-	112,6	-	-	-	-	4,25	-
	-	101	-	142,7	-	-	-	3,95	-
	-	101	110,6	142,7	11	17	<b>HJ316 E</b>	3,95	0,47
	-	101	110,6	142,7	-	-	-	3,95	-
	-	101	-	142,7	-	-	-	6,6	-
	-	101	110,6	142,7	11	20	<b>HJ2316 E</b>	6,7	0,5
	-	101	110,6	142,7	-	-	-	6,68	-
<b>170</b>	-	122	-	-	-	-	-	8,3	-
	-	110	-	158,8	-	-	-	8,3	-
	-	110	122	158,8	13	22	<b>HJ416</b>	8,3	0,79
	-	110	122	158,8	-	-	-	8,3	-

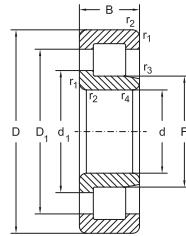
## Single Row Cylindrical Roller Bearings



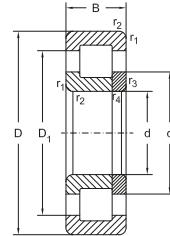
**N**



**NU**



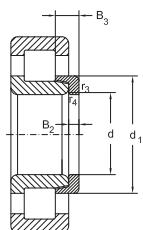
**NJ**



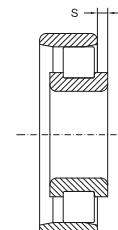
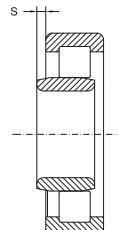
**NUP**

d mm	D mm	B mm	Dimensions			S ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	s						
<b>85</b>	130	22	1,1	1	4	≈	78	104	4800	5600	<b>NU1017 M</b>
	150	28	2	2	2		120	140	4300	5000	<b>N217</b>
	150	28	2	2	2		165	194	4300	5000	<b>NU217 E</b>
	150	28	2	2	-		165	194	4300	5000	<b>NJ217 E</b>
	150	28	2	2	-		165	194	4300	5000	<b>NUP217 E</b>
	150	36	2	2	2,4		216	275	3800	4500	<b>NU2217 E</b>
	150	36	2	2	-		216	275	3800	4500	<b>NJ2217 E</b>
	150	36	2	2	-		216	275	3800	4500	<b>NUP2217 E</b>
	180	41	3	3	3		271	300	3400	4000	<b>N317 EMB</b>
	180	41	3	3	3		288	325	3400	4000	<b>NU317 E</b>
	180	41	3	3	-		288	325	3400	4000	<b>NJ317 E</b>
	180	41	3	3	-		288	325	3400	4000	<b>NUP317 E</b>
	180	60	3	3	5		367	444	3400	4000	<b>NU2317 EM</b>
	180	60	3	3	-		367	444	3400	4000	<b>NJ2317 EM</b>
	180	60	3	3	-		367	444	3400	4000	<b>NUP2317 EM</b>
<b>90</b>	140	24	1,5	1,1	4	≈	93	125	4500	5300	<b>NU1018 M</b>
	160	30	2	2	1,4		156	185	3800	4500	<b>N218 M</b>
	160	30	2	2	1,4		183	216	3800	4500	<b>NU218 E</b>
	160	30	2	2	-		183	216	3800	4500	<b>NUP218 E</b>

## Single Row Cylindrical Roller Bearings



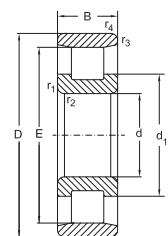
NJ+HJ



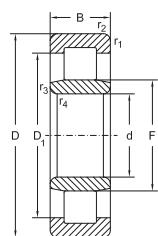
*Abutment and fillet dimensions see on page 210*

Dimensions	d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
								Designation	Bearing	Thrust collar	
											kg
<b>85</b>	-	96,5	101	114,1	6	-	11,5	<b>HJ1017</b>	1,1	0,14	
	133,8	-	108,8	-	-	-	-	-	1,9	-	
	-	100,5	-	130,3	-	-	-	-	1,9	-	
	-	100,5	107,6	130,3	8	-	12,5	<b>HJ217 E</b>	1,9	0,25	
	-	100,5	107,6	130,3	-	-	-	-	1,9	-	
	-	100,5	-	130,3	-	-	-	-	2,6	-	
	-	100,5	107,6	130,3	8	-	13	<b>HJ2217 E</b>	2,6	0,25	
	-	100,5	107,6	130,3	-	-	-	-	2,6	-	
	160	-	118	-	-	-	-	-	5,04	-	
	-	108	-	151,3	-	-	-	-	5,3	-	
	-	108	118	151,3	12	-	18,5	<b>HJ317 E</b>	5,3	0,58	
	-	108	118	151,3	-	-	-	-	5,3	-	
	-	108	-	151,3	-	-	-	-	7,49	-	
<b>177</b>	-	108	118	151,3	12	-	22	<b>HJ2317 E</b>	7,61	0,6	
	-	108	118	151,3	-	-	-	-	7,77	-	
	126	-	-	-	-	-	-	-	9,8	-	
	-	113	-	164,8	-	-	-	-	9,8	-	
	-	113	126	164,8	14	-	24	<b>HJ417</b>	9,8	0,92	
<b>90</b>	-	103	108	122,1	6	-	12	<b>HJ1018</b>	1,4	0,17	
	143	-	114,2	-	-	-	-	-	2,59	-	
	-	107	-	138,5	-	-	-	-	2,4	-	
	-	107	114,5	138,5	-	-	-	-	2,4	-	

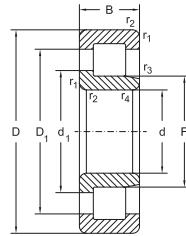
## Single Row Cylindrical Roller Bearings



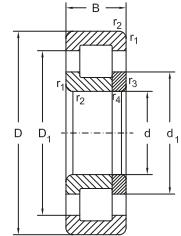
N



NU



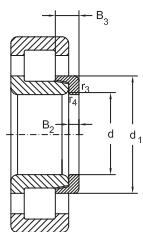
NJ



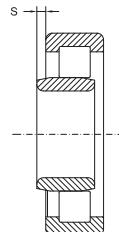
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.					grease	oil	
mm											
<b>90</b>	160	30	2	2	-	-	183	216	3800	4500	<b>NJ218 E</b>
	160	40	2	2	3,5	240	315	315	3200	3800	<b>NU2218 E</b>
	160	40	2	2	-	240	315	315	3200	3800	<b>NJ2218 E</b>
	160	40	2	2	-	240	315	315	3200	3800	<b>NUP2218 E</b>
	190	43	3	3	3	315	345	345	3200	3800	<b>N318 EMB</b>
	190	43	3	3	3	315	345	345	3200	3800	<b>NU318 E</b>
	190	43	3	3	-	315	345	345	3200	3800	<b>NJ318 E</b>
	190	43	3	3	-	315	345	345	3200	3800	<b>NUP318 E</b>
	190	64	3	3	6	430	530	530	3000	3600	<b>NU2318 E</b>
	190	64	3	3	-	430	530	530	3000	3600	<b>NJ2318 E</b>
	190	64	3	3	-	430	530	530	3000	3600	<b>NUP2318 E</b>
	225	54	4	4	5	393	427	427	2800	3400	<b>N418 M</b>
	225	54	4	4	5	393	427	427	2800	3400	<b>NU418 M</b>
	225	54	4	4	-	393	427	427	2800	3400	<b>NJ418 M</b>
	225	54	4	4	-	393	427	427	2800	3400	<b>NUP418 M</b>
<b>95</b>	145	24	1,5	1,1	4,1	96,5	129	4400	5200	<b>NU1019 M</b>	
	170	32	2,1	2,1	1,4	166	195	3800	4500	<b>N219</b>	
	170	32	2,1	2,1	1,4	210	249	3800	4500	<b>NU219 EM</b>	
	170	32	2,1	2,1	-	210	249	3800	4500	<b>NJ219 EM</b>	
	170	32	2,1	2,1	-	210	249	3800	4500	<b>NUP219 EM</b>	
	170	43	2,1	2,1	3,5	273	349	3200	3800	<b>NU2219 EM</b>	
	170	43	2,1	2,1	-	273	349	3200	3800	<b>NJ2219 EM</b>	
	170	43	2,1	2,1	-	273	349	3200	3800	<b>NUP2219 EM</b>	

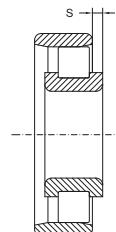
## Single Row Cylindrical Roller Bearings



NJ+HJ



S

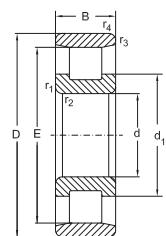


S

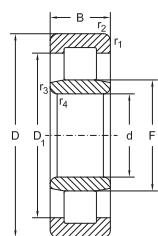
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar		Designation	Mass	
					$B_2$	$B_3$		Bearing	Thrust collar
kg									
90	-	107	114,5	138,5	9	14	HJ218 E	2,7	0,33
	-	107	-	138,5	-	-	-	3,2	-
	-	107	114,5	138,5	9	15	HJ2218 E	3,2	0,32
	-	107	114,5	138,5	-	-	-	3,2	-
	169,5	-	124	-	-	-	-	5,93	-
	-	113,5	-	160,2	-	-	-	5,4	-
	-	113,5	124	160,2	12	18,5	HJ318 E	5,4	0,63
	-	113,5	124	160,2	-	-	-	5,4	-
	-	113,5	-	160,2	-	-	-	8,1	-
	-	113,5	124	160,2	12	22	HJ2318 E	8,1	0,68
	-	113,5	124	160,2	-	-	-	8,1	-
	191,5	-	137	-	-	-	-	11,5	-
	-	123,5	-	178,8	-	-	-	11,5	-
95	-	108	113	127,1	6	12	HJ1019	1,45	0,18
	151,5	-	122	-	-	-	-	2,88	-
	-	112,5	-	147,4	-	-	-	3,24	-
	-	112,5	120,7	147,4	9	14	HJ219 E	3,25	0,35
	-	112,5	120,7	147,4	-	-	-	3,33	-
	-	112,5	-	147,4	-	-	-	4,29	-
	-	112,5	120,7	147,4	9	15,5	HJ2219 E	4,38	0,37
	-	112,5	120,7	147,4	-	-	-	4,42	-

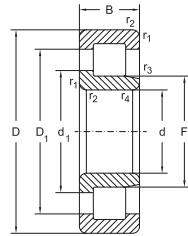
## Single Row Cylindrical Roller Bearings



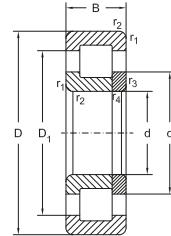
N



NU



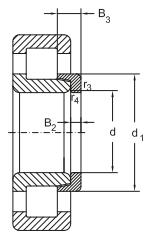
NJ



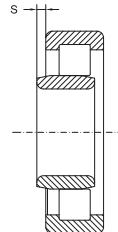
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	Basical radial load stat. $C_{0r}$	Speed limit		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	$\approx$				grease	oil	
<b>95</b>	200	45	3	3	3,5	-	242	170	3000	3600	<b>N319</b>
	200	45	3	3	3,5		311	351	3000	3600	<b>NU319 EM</b>
	200	45	3	3	-	-	311	351	3000	3600	<b>NJ319 EM</b>
	200	45	3	3	-		311	351	3000	3600	<b>NUP319 EM</b>
	200	67	3	3	7,2	-	388	488	2800	3400	<b>NU2319 M</b>
	200	67	3	3	-		388	488	2800	3400	<b>NJ2319 M</b>
	200	67	3	3	-		388	488	2800	3400	<b>NUP2319 M</b>
	240	55	4	4	5,2	-	415	465	2400	3000	<b>N419 M</b>
	240	55	4	4	5,2		415	465	2400	3000	<b>NU419 M</b>
	240	55	4	4	-	-	415	465	2400	3000	<b>NJ419 M</b>
	240	55	4	4	-		415	465	2400	3000	<b>NUP419 M</b>
<b>100</b>	150	24	1,5	1,1	4,3	-	98	134	4300	5000	<b>NU1020 M</b>
	180	34	2,1	2,1	1,4		250	305	3200	3800	<b>N220 E</b>
	180	34	2,1	2,1	1,4	-	250	305	3200	3800	<b>NU220 E</b>
	180	34	2,1	2,1	-		250	305	3200	3800	<b>NJ220 E</b>
	180	34	2,1	2,1	-	-	250	305	3200	3800	<b>NUP220 E</b>
	180	46	2,1	2,1	3		335	440	3000	3800	<b>NU2220 E</b>
	180	46	2,1	2,1	-	-	335	440	3000	3600	<b>NJ2220 E</b>
	180	46	2,1	2,1	-		335	440	3000	3600	<b>NUP2220 E</b>
	215	47	3	3	3,5	-	380	425	3000	3600	<b>N320 E</b>
	215	47	3	3	3,5		380	425	3000	3600	<b>NU320 E</b>
	215	47	3	3	-	-	380	425	3000	3600	<b>NJ320 E</b>
	215	47	3	3	-		380	425	3000	3600	<b>NUP320 E</b>

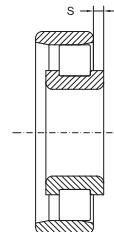
## Single Row Cylindrical Roller Bearings



NJ+HJ



S

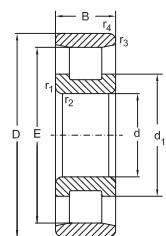


S

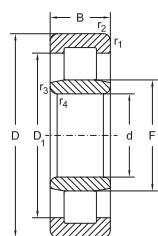
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	Dimensions				Designation	Thrust collar		Mass	
				$D_1 \approx$	$B_2$	$B_3$	Bearing		kg	Thrust collar	Bearing	Thrust collar
95	173,5	-	133	-	-	-	-	-	6,47	-		
	-	121,5	-	168,2	-	-	-	-	7	-		
	-	121,5	132,2	168,2	13	20,5	<b>HJ319 E</b>	7,2	0,8			
	-	121,5	132,2	168,2	-	-	-	-	7,26	-		
	-	121,5	-	168,2	-	-	-	-	10,5	-		
	-	121,5	132,2	168,2	13	24,5	<b>HJ2319 E</b>	10,5	0,93			
	-	121,5	132,2	168,2	-	-	-	-	10,9	-		
	201,5	-	147	-	-	-	-	-	13,8	-		
	-	133,5	-	188,8	-	-	-	-	13,8	-		
	-	133,5	147	188,8	15	25,5	<b>HJ419</b>	13,8	1,3			
	-	133,5	147	188,8	-	-	-	-	13,8	-		
100	-	113	118	132,1	6	12	<b>HJ1020</b>	1,5	0,18			
	163	-	127,3	-	-	-	-	3,44	-			
	-	119	-	155,5	-	-	-	3,44	-			
	-	119	127,3	155,5	10	15	<b>HJ220 E</b>	3,44	0,44			
	-	119	127,3	155,5	-	-	-	3,44	-			
	-	119	-	155,5	-	-	-	5,5	-			
	-	119	127,3	155,5	10	16	<b>HJ2220 E</b>	5,5	0,45			
	-	119	127,3	155,5	-	-	-	5,5	-			
	191,5	-	139,6	-	-	-	-	7,7	-			
	-	127,5	-	181	-	-	-	7,7	-			
	-	127,5	139,6	181	13	20,5	<b>HJ320 E</b>	7,7	0,9			
	-	127,5	139,6	181	-	-	-	7,7	-			

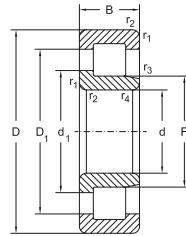
## Single Row Cylindrical Roller Bearings



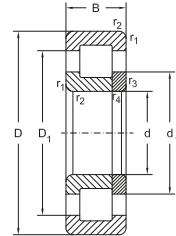
N



NU



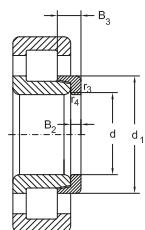
NJ



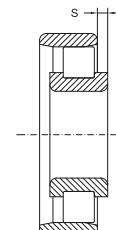
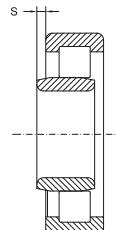
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	$\approx$						
<b>100</b>	215	73	3	3	6,1	570	720	2600	3200	<b>NU2320 E</b>	
	215	73	3	3	-	570	720	2600	3200	<b>NJ2320 E</b>	
	215	73	3	3	-	570	720	2600	3200	<b>NUP2320 E</b>	
	250	58	4	4	5,7	440	490	2400	3000	<b>N420 M</b>	
	250	58	4	4	5,7	440	490	2400	3000	<b>NU420 M</b>	
	250	58	4	4	-	440	490	2400	3000	<b>NJ420 M</b>	
	250	58	4	4	-	440	490	2400	3000	<b>NUP420 M</b>	
<b>105</b>	160	26	2	1,1	4,5	112	153	3800	4500	<b>NU1021 M</b>	
	190	36	2,1	2,1	1,4	260	320	3000	3600	<b>N221 E</b>	
	190	36	2,1	2,1	1,4	260	320	3000	3600	<b>NU221 E</b>	
	190	36	2,1	2,1	-	260	320	3000	3600	<b>NJ221 E</b>	
	190	36	2,1	2,1	-	260	320	3000	3600	<b>NUP221 E</b>	
	225	49	3	3	3,4	335	380	2600	3200	<b>N321 E</b>	
	225	49	3	3	3,4	335	380	2600	3200	<b>NU321 E</b>	
	225	49	3	3	-	335	380	2600	3200	<b>NJ321 E</b>	
	225	49	3	3	-	335	380	2600	3200	<b>NUP321 E</b>	
	260	60	4	4	5,7	490	540	2200	2800	<b>NU421 M</b>	
	260	60	4	4	-	490	540	2200	2800	<b>NJ421 M</b>	
	260	60	4	4	-	490	540	2200	2800	<b>NUP421 M</b>	
<b>110</b>	170	28	2	1,1	4,5	140	190	3600	4500	<b>NU1022 M</b>	
	200	38	2,1	2,1	1,4	290	365	3000	3600	<b>N222 E</b>	
	200	38	2,1	2,1	1,4	290	365	3000	3600	<b>NU222 E</b>	
	200	38	2,1	2,1	-	290	365	3000	3600	<b>NJ222 E</b>	

## Single Row Cylindrical Roller Bearings



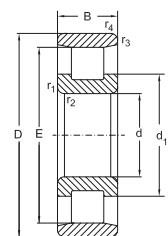
NJ+HJ



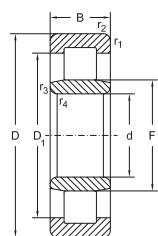
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar			Mass		
					$B_2$	$B_3$	Designation	Bearing	Thrust collar	
									kg	
100	-	127,5	-	181	-	-	-	12	-	
	-	127,5	139,6	181	13	23,5	<b>HJ2320 E</b>	12	0,95	
	-	127,5	139,6	181	-	-	-	12	-	
	211	-	153,5	-	-	-	-	15,8	-	
	-	139	-	197	-	-	-	15,8	-	
	-	139	153,5	197	16	27	<b>HJ420</b>	15,8	1,6	
	-	139	153,5	197	-	-	-	15,8	-	
105	-	119,5	124,5	140,3	7	13,5	<b>HJ1021</b>	1,9	0,24	
	171,5	-	134,7	-	-	-	-	4,1	-	
	-	125,5	-	163	-	-	-	4,1	-	
	-	125,5	134,7	163	10	16	<b>HJ221 E</b>	4,1	0,52	
	-	125,5	134,7	163	-	-	-	4,1	-	
	195	-	147	-	-	-	-	9,1	-	
	-	135	-	183,8	-	-	-	9,1	-	
	-	135	147	183,8	13	20,5	<b>HJ321 E</b>	9,1	1	
	-	135	147	183,8	-	-	-	9,1	-	
	-	144,5	-	206	-	-	-	17,5	-	
	-	144,5	159,5	206	16	27	<b>HJ421</b>	17,5	1,7	
110	-	125	131	149	7	13,5	<b>HJ1022</b>	2,4	0,27	
	180,5	-	141,6	-	-	-	-	4,9	-	
	-	132,5	-	172,4	-	-	-	4,9	-	
	-	132,5	141,6	172,4	11	17	<b>HJ222 E</b>	4,9	0,62	

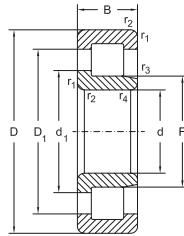
## Single Row Cylindrical Roller Bearings



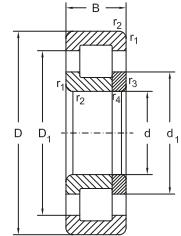
N



NU



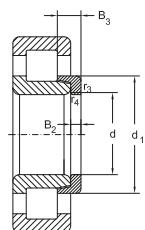
NJ



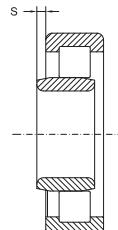
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	s						
mm											
<b>110</b>	200	38	2,1	2,1	-	290	365	3000	3600	<b>NUP222 E</b>	
	200	53	2,1	2,1	4	380	520	2800	3400	<b>NU2222 E</b>	
	200	53	2,1	2,1	-	380	520	2800	3400	<b>NJ2222 E</b>	
	200	53	2,1	2,1	-	380	520	2800	3400	<b>NUP2222 E</b>	
	240	50	3	3	4	443	513	2400	3000	<b>N322 E</b>	
	240	50	3	3	4	443	513	2400	3000	<b>NU322 E</b>	
	240	50	3	3	-	443	513	2400	3000	<b>NJ322 E</b>	
	240	50	3	3	-	443	513	2400	3000	<b>NUP322 E</b>	
	240	80	3	3	7,2	630	800	2200	2800	<b>NU2322 E</b>	
	240	80	3	3	-	630	800	2200	2800	<b>NJ2322 E</b>	
	240	80	3	3	-	630	800	2200	2800	<b>NUP2322 E</b>	
	280	65	4	4	6,2	583	672	2200	2800	<b>NU422 M</b>	
	280	65	4	4	-	583	672	2200	2800	<b>NJ422 M</b>	
	280	65	4	4	-	583	672	2200	2800	<b>NUP422 M</b>	
<b>120</b>	180	28	2	1	3,2	150	208	3400	4000	<b>NU1024 M</b>	
	215	40	2,1	2,1	3,5	335	415	2600	3200	<b>N224 E</b>	
	215	40	2,1	2,1	3,5	335	415	2600	3200	<b>NU224 E</b>	
	215	40	2,1	2,1	-	335	415	2600	3200	<b>NJ224 E</b>	
	215	40	2,1	2,1	-	335	415	2600	3200	<b>NUP224 E</b>	
	215	58	2,1	2,1	5	450	610	2600	3200	<b>NU2224 E</b>	
	215	58	2,1	2,1	-	450	610	2600	3200	<b>NJ2224 E</b>	
	215	58	2,1	2,1	-	450	610	2600	3200	<b>NUP2224 E</b>	
	260	55	3	3	4,5	520	600	2200	2800	<b>N324 E</b>	

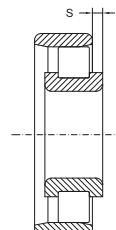
## Single Row Cylindrical Roller Bearings



NJ+HJ



S

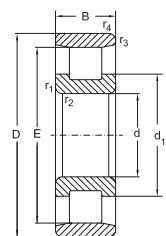


S

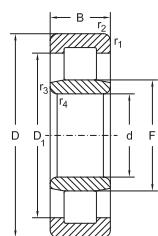
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
							Designation		Bearing	Thrust collar
										kg
<b>110</b>	-	132,5	141,6	172,4	-	-	-	-	4,9	-
	-	132,5	-	172,4	-	-	-	-	6,7	-
	-	132,5	141,6	172,4	11	19,5	<b>HJ2222 E</b>		6,7	0,65
	-	132,5	141,6	172,4	-	-	-	-	6,7	-
	211	-	155,9	-	-	-	-	-	10,5	-
	-	143	-	199,9	-	-	-	-	10,5	-
	-	143	155,9	199,9	14	22	<b>HJ322 E</b>		10,5	1,2
	-	143	155,9	199,9	-	-	-	-	10,5	-
	-	143	-	199,9	-	-	-	-	17,0	-
	-	143	155,9	199,9	14	26,5	<b>HJ2322 E</b>		17,0	1,3
	-	143	155,9	199,9	-	-	-	-	17,0	-
	-	155	-	219,5	-	-	-	-	20,8	-
	-	155	171	219,5	17	29,5	<b>HJ422</b>		20,8	2,1
	-	155	171	219,5	-	-	-	-	20,8	-
<b>120</b>	-	135	141	158,8	7	13,5	<b>HJ1024</b>		2,6	0,3
	195,5	-	153,5	-	-	-	-	-	5,7	-
	-	143,5	-	186,9	-	-	-	-	5,7	-
	-	143,5	153,5	186,9	11	17	<b>HJ224 E</b>		5,7	0,72
	-	143,5	153,5	186,9	-	-	-	-	5,7	-
	-	143,5	-	186,9	-	-	-	-	8,3	-
	-	143,5	153,5	186,9	11	20	<b>HJ2224 E</b>		8,3	0,75
	-	143,5	153,5	186,9	-	-	-	-	8,3	-
	230	-	168,7	-	-	-	-	-	15,2	-

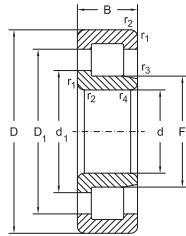
## Single Row Cylindrical Roller Bearings



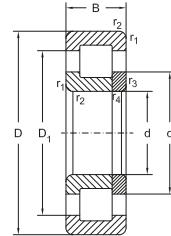
N



NU



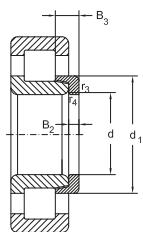
NJ



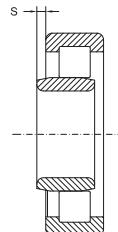
NUP

d mm	D mm	B mm	Dimensions			s $\approx$	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	$s \approx$						
<b>120</b>	260	55	3	3	4,5		520	600	2200	2800	<b>NU324 E</b>
	260	55	3	3	-		520	600	2200	2800	<b>NJ324 E</b>
	260	55	3	3	-		520	600	2200	2800	<b>NUP324 E</b>
	260	86	3	3	7,2		780	1020	2000	2600	<b>NU2324 EM</b>
	260	86	3	3	-		780	1020	2000	2600	<b>NJ2324 EM</b>
	260	86	3	3	-		780	1020	2000	2600	<b>NUP2324 EM</b>
	310	72	5	5	6,9		670	780	1800	2200	<b>NU424 M</b>
	310	72	5	5	-		670	780	1800	2200	<b>NJ424 M</b>
<b>130</b>	200	33	2	1	5,5		180	250	3000	3600	<b>NU1026 M</b>
	230	40	3	3	3,6		360	450	2400	3000	<b>N226 E</b>
	230	40	3	3	3,6		360	450	2400	3000	<b>NU226 E</b>
	230	40	3	3	-		360	450	2400	3000	<b>NJ226 E</b>
	230	40	3	3	-		360	450	2400	3000	<b>NUP226 E</b>
	230	64	3	3	6		530	735	2400	3000	<b>NU2226 E</b>
	230	64	3	3	-		530	735	2400	3000	<b>NJ2226 E</b>
	230	64	3	3	-		530	735	2400	3000	<b>NUP2226 E</b>
	280	58	4	4	4,5		570	670	2000	2600	<b>N326 E</b>
	280	58	4	4	4,5		570	670	2000	2600	<b>NU326 E</b>
	280	58	4	4	-		570	670	2000	2600	<b>NJ326 E</b>
	280	58	4	4	-		570	670	2000	2600	<b>NUP326 E</b>
	280	93	4	4	8,1		915	1220	1900	2400	<b>NU2326 EM</b>
	280	93	4	4	-		915	1220	1900	2400	<b>NJ2326 EM</b>
	280	93	4	4	-		915	1220	1900	2400	<b>NUP2326 EM</b>

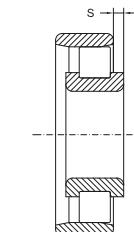
## Single Row Cylindrical Roller Bearings



NJ+HJ

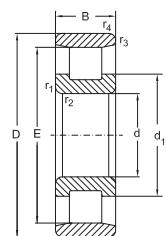


*Abutment and fillet dimensions see on page 210*

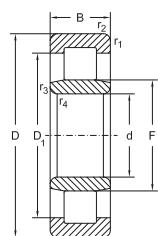


d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
							Designation		Bearing	Thrust collar
										kg
120	-	154	-	217,3	-	-	-		13,4	-
	-	154	168,7	217,3	14	22,5	<b>HJ324 E</b>		13,4	1,4
	-	154	168,7	217,3	-	-	-		13,4	-
	-	154	-	217,3	-	-	-		23,5	-
	-	154	168,7	217,3	14	26	<b>HJ2324 E</b>		23,5	1,5
	-	154	168,7	217,3	-	-	-		23,5	-
	-	170	-	242,5	-	-	-		30,5	-
	-	170	188	242,5	17	30,5	<b>HJ424</b>		30,5	2,7
130	-	148	155	175	8	16	<b>HJ1026</b>		3,9	0,45
	209,5	-	164,2	-	-	-	-		6,5	-
	-	153,5	-	200,2	-	-	-		6,5	-
	-	153,5	164,2	200,2	11	17	<b>HJ226 E</b>		6,5	0,8
	-	153,5	164,2	200,2	-	-	-		6,5	-
	-	153,5	182,3	200,2	-	-	-		10,5	-
	-	153,5	-	200,2	11	21	<b>HJ2226 E</b>		10,5	0,85
	-	153,5	182,3	200,2	-	-	-		10,5	-
	247	-	182,3	-	-	-	-		16,5	-
	-	167	-	233,8	-	-	-		16,5	-
	-	167	182,3	233,8	14	23	<b>HJ326 E</b>		16,5	1,7
	-	167	182,3	233,8	-	-	-		16,5	-
	-	167	-	233,8	-	-	-		29,6	-
	-	167	182,3	233,8	14	28	<b>HJ2326 E</b>		29,6	1,8
	-	167	182,3	233,8	-	-	-		29,6	-

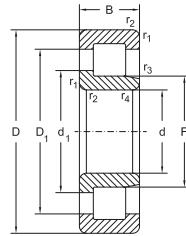
## Single Row Cylindrical Roller Bearings



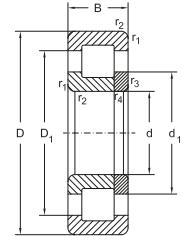
N



NU



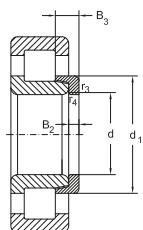
NJ



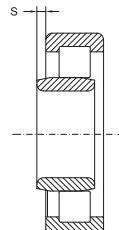
NUP

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	Speed limit oil min <sup>-1</sup>	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	$\approx$						
<b>130</b>	340	78	6	5	6,5	-	790	960	1800	2200	<b>NU426 M</b>
	340	78	6	5	-		790	960	1800	2200	<b>NJ426 M</b>
<b>140</b>	210	33	2	1,1	3,8	183	265	2800	3400	3400	<b>NU1028 M</b>
	250	42	3	3	3,7	390	510	2400	3000	3000	<b>N228 EM</b>
	250	42	3	3	3,7	390	510	2400	3000	3000	<b>NU228 EM</b>
	250	42	3	3	-	390	510	2400	3000	3000	<b>NJ228 EM</b>
	250	42	3	3	-	390	510	2400	3000	3000	<b>NUP228 EM</b>
	250	68	3	3	7	570	830	2200	2800	2800	<b>NU2228 EM</b>
	250	68	3	3	-	570	830	2200	2800	2800	<b>NJ2228 EM</b>
	250	68	3	3	-	570	830	2200	2800	2800	<b>NUP2228 EM</b>
	300	62	4	4	5,2	670	800	1900	2400	2400	<b>N328 E</b>
	300	62	4	4	5,2	670	800	1900	2400	2400	<b>NU328 E</b>
	300	62	4	4	-	670	800	1900	2400	2400	<b>NJ328 E</b>
	300	62	4	4	-	670	800	1900	2400	2400	<b>NUP328 E</b>
	300	102	4	4	9,2	1130	1589	1800	2200	2200	<b>NU2328 EM</b>
	300	102	4	4	-	1130	1589	1800	2200	2200	<b>NJ2328 EM</b>
	300	102	4	4	-	1130	1589	1800	2200	2200	<b>NUP2328 EM</b>
	360	82	6	5	7	850	1020	1600	1900	1900	<b>NU428 M</b>
	360	82	6	5	-	850	1020	1600	1900	1900	<b>NJ428 M</b>
<b>150</b>	225	35	2,1	1,5	4,2	208	310	2600	3200	3200	<b>NU1030 M</b>
	270	45	3	3	4	440	585	2200	2800	2800	<b>N230 EM</b>
	270	45	3	3	4	440	585	2200	2800	2800	<b>NU230 EM</b>
	270	45	3	3	-	440	585	2200	2800	2800	<b>NJ230 EM</b>

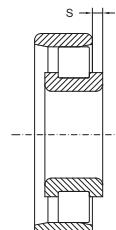
## Single Row Cylindrical Roller Bearings



NJ+HJ



S

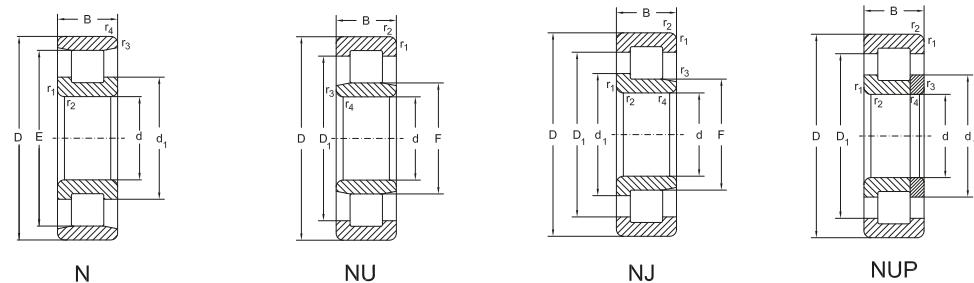


S

*Abutment and fillet dimensions see on page 210*

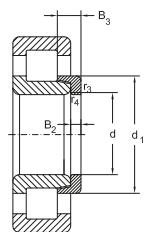
d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar			Mass		
					$B_2$	$B_3$	Designation	Bearing	Thrust collar	
									kg	
<b>130</b>	-	185	-	265	-	-	-	42,6	-	
	-	185	205	265	18	32	<b>HJ426</b>	42,6	3,4	
<b>140</b>	-	158	165	185	8	16	<b>HJ1028</b>	4,1	0,48	
	225	-	180	-	-	-	-	9,5	-	
	-	169	-	215,3	-	-	-	9,5	-	
	-	169	180	215,3	11	18	<b>HJ228 E</b>	9,5	1	
	-	169	180	215,3	-	-	-	9,5	-	
	-	169	-	215,3	-	-	-	15,5	-	
	-	169	180	215,3	11	23	<b>HJ2228 E</b>	15,5	1,1	
	-	169	180	215,3	-	-	-	15,5	-	
	264	-	195,5	-	-	-	-	22,5	-	
	-	180	-	250,3	-	-	-	22,5	-	
	-	180	195,5	250,3	15	25	<b>HJ328 E</b>	22,5	2	
	-	180	195,5	250,3	-	-	-	22,5	-	
	-	180	-	250,3	-	-	-	37,2	-	
	-	180	195,5	250,3	15	31	<b>HJ2328 E</b>	37,2	2,2	
	-	180	195,5	250,3	-	-	-	37,2	-	
	-	198	-	281	-	-	-	49,5	-	
	-	198	219	281	18	33	<b>HJ428</b>	49,5	3,9	
<b>150</b>	-	169,5	176,5	198,1	9	18	<b>HJ1030</b>	5	0,6	
	242	-	193,7	-	-	-	-	11,8	-	
	-	182	-	231,8	-	-	-	11,8	-	
	-	182	193,7	231,8	12	19,5	<b>HJ230 E</b>	11,8	1,3	

## Single Row Cylindrical Roller Bearings

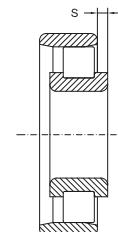
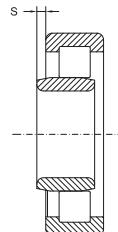


d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease min <sup>-1</sup>	oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	s						
mm											
<b>150</b>	270	45	3	3	-		440	585	2200	2800	<b>NUP230 EM</b>
	270	73	3	3	7,3		655	980	2000	2600	<b>NU2230 EM</b>
	270	73	3	3	-		655	980	2000	2600	<b>NJ2230 EM</b>
	270	73	3	3	-		655	980	2000	2600	<b>NUP2230 EM</b>
	320	65	4	4	5,5		800	1000	1800	2200	<b>N330 EM</b>
	320	65	4	4	5,5		800	1000	1800	2200	<b>NU330 EM</b>
	320	65	4	4	-		800	1000	1800	2200	<b>NJ330 EM</b>
	320	65	4	4	-		800	1000	1800	2200	<b>NUP330 EM</b>
	320	108	4	4	9,8		1160	1600	1700	2000	<b>NU2330 EM</b>
	320	108	4	4	-		1160	1600	1700	2000	<b>NJ2330 EM</b>
	320	108	4	4	-		1160	1600	1700	2000	<b>NUP2330 EM</b>
	380	85	6	5	7,5		898	1145	1500	1800	<b>NU430 M</b>
	380	85	6	5	-		898	1145	1500	1800	<b>NJ430 M</b>
<b>160</b>	240	38	2,1	1,5	4,3		245	355	2400	3000	<b>NU1032 M</b>
	290	48	3	3	4,1		500	670	2000	2600	<b>N232 EM</b>
	290	48	3	3	4,1		500	670	2000	2600	<b>NU232 EM</b>
	290	48	3	3	-		500	670	2000	2600	<b>NJ232 EM</b>
	290	48	3	3	-		500	670	2000	2600	<b>NUP232 EM</b>
	290	80	3	3	7,3		800	1180	1900	2400	<b>NU2232 EM</b>
	290	80	3	3	-		800	1180	1900	2400	<b>NJ2232 EM</b>
	290	80	3	3	-		800	1180	1900	2400	<b>NUP2232 EM</b>
	340	68	4	4	5,5		865	1060	1600	1900	<b>N332 EM</b>
	340	68	4	4	5,5		865	1060	1600	1900	<b>NU332 EM</b>

## Single Row Cylindrical Roller Bearings



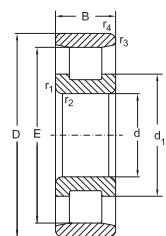
NJ+HJ



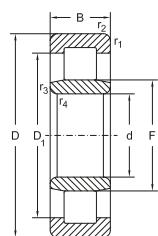
*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	$D_1 \approx$	Thrust collar		Designation	Mass	
					$B_2$	$B_3$		Bearing	Thrust collar
kg									
150	-	182	193,7	231,8	-	-	-	11,8	-
	-	182	-	231,8	-	-	-	19,5	-
	-	182	193,7	231,8	12	24,5	<b>HJ2230 E</b>	19,5	1,4
	-	182	193,7	231,8	-	-	-	19,5	-
	283	-	210,1	-	-	-	-	27,5	-
	-	193	-	268,4	-	-	-	27,5	-
	-	193	210,1	268,4	15	25	<b>HJ330 E</b>	27,5	2,4
	-	193	210,1	268,4	-	-	-	27,5	-
	-	193	-	268,4	-	-	-	44,8	-
	-	193	210,1	268,4	15	31,5	<b>HJ2330 E</b>	44,8	2,5
	-	193	210,1	268,4	-	-	-	44,8	-
160	-	180	188	211,7	10	19	<b>HJ1032</b>	6,2	0,75
	259	-	207,4	-	-	-	-	14,6	-
	-	195	-	248,2	-	-	-	14,6	-
	-	195	207,4	248,2	12	20	<b>HJ232 E</b>	14,6	1,5
	-	195	207,4	248,2	-	-	-	14,6	-
	-	193	-	249,7	-	-	-	24,5	-
	-	193	206,1	249,7	12	24,5	<b>HJ2232 E</b>	24,5	1,6
	-	193	206,1	249,7	-	-	-	24,5	-
300	-	222,2	-	-	-	-	-	32,3	-
	-	204	-	284,6	-	-	-	32,3	-

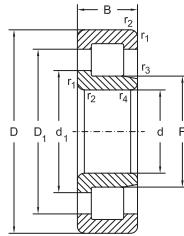
## Single Row Cylindrical Roller Bearings



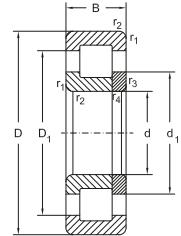
**N**



**NU**



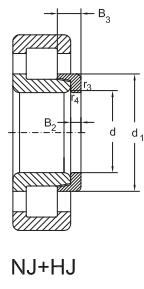
**NJ**



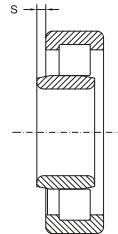
**NUP**

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	$\approx$				grease	oil	
mm											
<b>160</b>	340	68	4	4	-		918	1148	1600	1900	<b>NJ332 EM</b>
	340	68	4	4	-		865	1060	1600	1900	<b>NUP332 EM</b>
	340	114	4	4	10		1320	1830	1600	1900	<b>NU2332 EM</b>
	340	114	4	4	-		1320	1830	1600	1900	<b>NJ2332 EM</b>
	340	114	4	4	-		1320	1830	1600	1900	<b>NUP2332 EM</b>
<b>170</b>	260	42	2,1	2,1	6,9		300	430	2200	2800	<b>NU1034 M</b>
	310	52	4	4	4,3		618	828	1800	2200	<b>NU234 EM6</b>
	310	52	4	4	-		618	828	1800	2200	<b>NJ234 EM6</b>
	310	52	4	4	-		618	828	1800	2200	<b>NUP234 EM6</b>
	310	86	4	4	7,2		950	1400	1700	2000	<b>NU2234 EM</b>
	310	86	4	4	-		950	1400	1700	2000	<b>NJ2234 EM</b>
	310	86	4	4	-		950	1400	1700	2000	<b>NUP2234 EM</b>
	360	72	4	4	7		800	1020	1600	1900	<b>N334 EM</b>
	360	72	4	4	7		928	1150	1600	1900	<b>NU334 EM</b>
	360	72	4	4	-		928	1150	1600	1900	<b>NJ334 EM</b>
	360	72	4	4	-		928	1150	1600	1900	<b>NUP334 EM</b>
	360	120	4	4	13		1220	1760	1500	1800	<b>NU2334 M</b>
	360	120	4	4	-		1220	1760	1500	1800	<b>NJ2334 M</b>
	360	120	4	4	-		1220	1760	1500	1800	<b>NUP2334 M</b>
<b>180</b>	280	46	2,1	2,1	7		360	520	2200	2800	<b>NU1036 M</b>
	320	52	4	4	4,5		610	830	1800	2200	<b>N236 EM</b>
	320	52	4	4	4,5		610	830	1800	2200	<b>NJ236 EM</b>

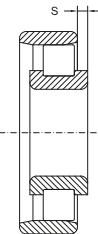
## Single Row Cylindrical Roller Bearings



NJ+HJ

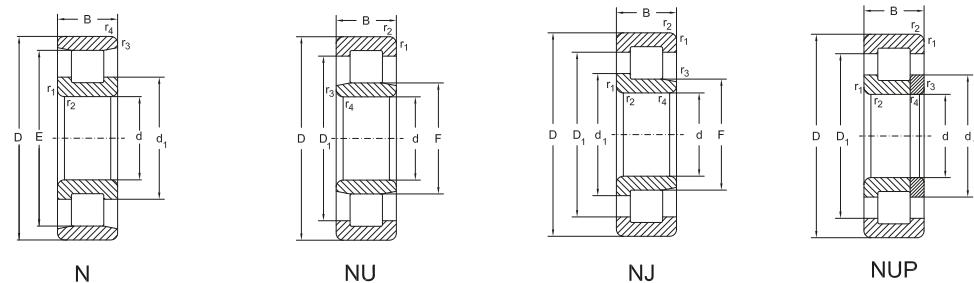


*Abutment and fillet dimensions see on page 210*



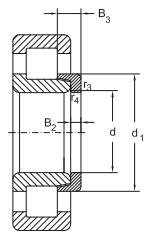
d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
							Designation	Bearing	Thrust collar	
										kg
160	-	204	222,2	284,6	15	25	HJ332 E	32,1	2,7	
	-	204	222,2	284,6	-	-	-	32,1	-	
	-	204	-	284,6	-	-	-	53,5	-	
	-	204	222,2	284,6	15	32	HJ2332 E	53,5	2,9	
	-	204	222,2	284,6	-	-	-	53,5	-	
170	-	193	200,9	227,7	11	21	HJ1034	8,4	1	
	-	207	-	267,1	-	-	-	18,2	-	
	-	207	220,8	267,1	12	20	HJ234 E	18,2	1,7	
	-	207	220,8	267,1	-	-	-	18,2	-	
	-	205	-	268,5	-	-	-	29,8	-	
	-	205	219,6	268,5	12	24	HJ2234 E	29,8	1,8	
	-	205	219,6	268,5	-	-	-	29,8	-	
	310	-	238	-	-	-	-	38	-	
	-	220	-	292,5	-	-	-	38	-	
	-	220	238	292,5	16	29,5	HJ334 E	38	3,3	
	-	220	238	292,5	-	-	-	38	-	
	-	220	-	292,5	-	-	-	63,5	-	
180	-	205	214,1	244,7	12	22,5	HJ1036	10,9	1,3	
	289	-	230,2	-	-	-	-	18,9	-	
	-	217	-	277,2	-	-	-	18,9	-	

## Single Row Cylindrical Roller Bearings

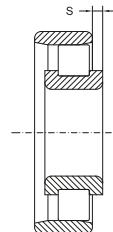
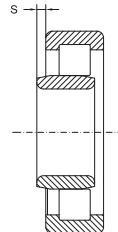


d	D	B	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease      oil	Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	s					
mm										
<b>180</b>	320	52	4	4	-	610	830	1800	2200	<b>NJ236 EM</b>
	320	52	4	4	-	610	830	1800	2200	<b>NUP236 EM</b>
	320	86	4	4	7,2	1000	1500	1700	2000	<b>NU2236 EM</b>
	320	86	4	4	-	1000	1500	1700	2000	<b>NJ2236 EM</b>
	320	86	4	4	-	1000	1500	1700	2000	<b>NUP2236 EM</b>
	380	75	4	4	6,9	900	1160	1500	1800	<b>N336 M</b>
	380	75	4	4	6,9	900	1160	1500	1800	<b>NU336 M</b>
	380	75	4	4	-	900	1160	1500	1800	<b>NJ336 M</b>
	380	75	4	4	-	900	1160	1500	1800	<b>NUP336 M</b>
	380	126	4	4	13	1370	2000	1400	1700	<b>NU2336 M</b>
	380	126	4	4	-	1370	2000	1400	1700	<b>NJ2336 M</b>
	380	126	4	4	-	1370	2000	1400	1700	<b>NUP2336 M</b>
<b>190</b>	290	46	2,1	2,1	5	365	550	2000	2600	<b>NU1038 M</b>
	340	55	4	4	4,7	680	930	1700	2000	<b>N238 EM</b>
	340	55	4	4	4,7	680	930	1700	2000	<b>NU238 EM</b>
	340	55	4	4	-	680	930	1700	2000	<b>NJ238 EM</b>
	340	55	4	4	-	680	930	1700	2000	<b>NUP238 EM</b>
	340	92	4	4	8	854	1338	1600	1900	<b>NU2238 EM</b>
	340	92	4	4	-	854	1338	1600	1900	<b>NJ2238 M</b>
	400	78	5	5	7,1	1236	1635	1400	1700	<b>NU338 EM</b>
	400	78	5	5	-	1236	1635	1400	1700	<b>NJ338 EM</b>
	400	132	5	5	13,5	1789	1635	1400	1700	<b>NU2338 EM6</b>
	400	132	5	5	-	1789	2628	1400	1700	<b>NJ2338 EM6</b>

## Single Row Cylindrical Roller Bearings



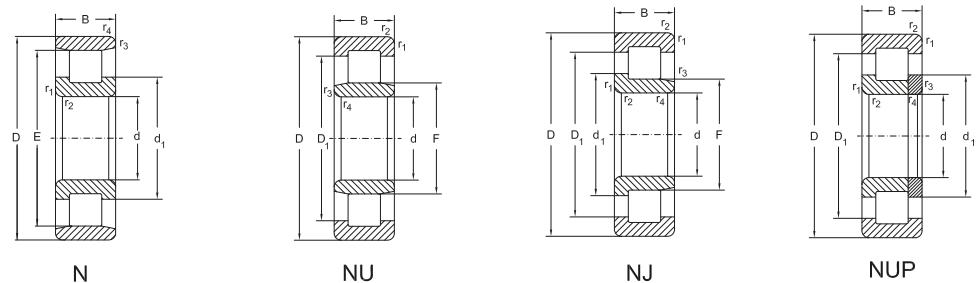
NJ+HJ



*Abutment and fillet dimensions see on page 210*

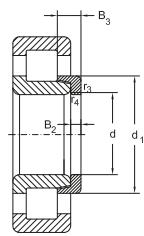
d	E	F	Dimensions				Thrust collar	Mass	
			$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$		Bearing	Thrust collar
kg									
<b>180</b>	-	217	230,2	277,2	12	20	<b>HJ236 E</b>	19	1,8
	-	217	230,2	277,2	-	-	-	19	-
	-	215	-	278,6	-	-	-	31,2	-
	-	215	229,6	278,6	12	24	<b>HJ2236 E</b>	31,2	1,9
	-	215	229,6	278,6	-	-	-	31,2	-
	328	-	252	-	-	-	-	44	-
	-	232	-	308,5	-	-	-	44	-
	-	232	252	308,5	17	30,5	<b>HJ336</b>	44	3,9
	-	232	252	308,5	-	-	-	44	-
	-	232	-	308,5	-	-	-	74	-
<b>190</b>	-	232	252	308,5	17	40	<b>HJ2336</b>	74	4,9
	-	232	252	308,5	-	-	-	74	-
	-	215	225	254,5	12	22,5	<b>HJ1038</b>	11,4	1,4
	306	-	244,6	-	-	-	-	22,8	-
	-	230	-	293,6	-	-	-	22,8	-
	-	230	244,6	293,6	13	21,5	<b>HJ238 E</b>	22,8	2,2
	-	230	244,6	293,6	-	-	-	22,8	-
	-	231	-	285,2	-	-	-	36,7	-
	-	231	246	285,2	13	26,5	<b>HJ2238 E</b>	37,6	2,4
	-	245	-	334,5	-	-	-	50,5	-
	-	245	263,5	334,5	18	31	<b>HJ338</b>	50,5	4,5
	-	245	-	334,5	-	-	-	83,5	-
	-	245	263,5	334,5	18	36,5	<b>HJ2338 E</b>	83,5	5

## Single Row Cylindrical Roller Bearings

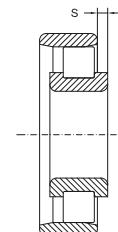
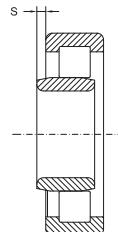


d	D	B	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{0r}$	Speed limit grease      oil	Designation	
			$r_1, r_2$ min.	$r_3, r_4$ min.							
mm											
<b>190</b>	400	132	5	5	-		1789	2628	1400	1700	<b>NUP2338 EM6</b>
<b>200</b>	310	51	2,1	2,1	8,3	400	600	2000	2600	<b>NU1040 M</b>	
	360	58	4	4	5	750	1040	1600	1900	<b>N240 EM</b>	
	360	58	4	4	5	750	1040	1600	1900	<b>NU240 EM</b>	
	360	58	4	4	-	750	1040	1600	1900	<b>NJ240 EM</b>	
	360	58	4	4	-	750	1040	1600	1900	<b>NUP240 EM</b>	
	360	98	4	4	8,1	1220	1860	1500	1800	<b>NU2240 EM</b>	
	360	98	4	4	-	1220	1860	1500	1800	<b>NJ2240 EM</b>	
	420	80	5	5	7,5	965	1250	1400	1700	<b>NU340 M</b>	
	420	80	5	5	-	965	1250	1400	1700	<b>NJ340 M</b>	
	420	138	5	5	15	1740	2685	1300	1600	<b>NU2340 M</b>	
	420	138	5	5	-	1740	2685	1300	1600	<b>NJ2340 M</b>	
<b>220</b>	340	56	3	3	6,2	650	1047	1700	2000	<b>NU1044 M</b>	
	400	65	4	4	6	778	1113	1500	1800	<b>NU244 M</b>	
	400	65	4	4	-	778	1113	1500	1800	<b>NJ244 M</b>	
	400	65	4	4	-	778	1113	1500	1800	<b>NUP244 M</b>	
	400	108	4	4	11,8	1370	2310	1400	1700	<b>NU2244 M</b>	
	400	108	4	4	-	1160	1870	1400	1700	<b>NJ2244 M</b>	
	460	88	5	5	8	1230	1650	1300	1600	<b>NU344 M</b>	
	460	145	5	5	10	1760	2600	1200	1500	<b>NU2344 E</b>	
<b>240</b>	360	56	3	3	8,5	695	1168	1600	1900	<b>NU1048 M</b>	
	440	72	4	4	7	936	1339	1400	1700	<b>NU248 M</b>	
	440	72	4	4	-	936	1339	1400	1700	<b>NJ248 M</b>	

## Single Row Cylindrical Roller Bearings



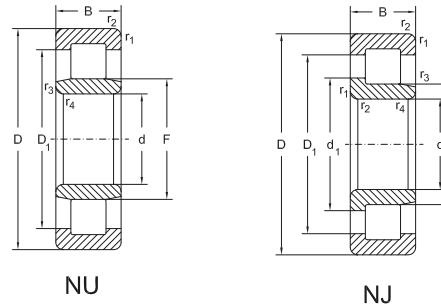
NJ+HJ



*Abutment and fillet dimensions see on page 210*

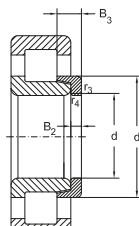
Dimensions	d	E	F	d <sub>1</sub> ≈	D <sub>1</sub> ≈	B <sub>2</sub>	B <sub>3</sub>	Thrust collar		Mass	
								Designation	Bearing	Thrust collar	
											kg
<b>190</b>	-	245	263,5	334,5	-	-	-	-	85,8	-	
<b>200</b>	-	229	239,5	270,1	13	25,5	HJ1040	14,8	1,7		
	323	-	258,2	-	-	-	-	26,9	-		
	-	243	-	310,1	-	-	-	26,9	-		
	-	243	258,2	310,1	14	23	HJ240 E	26,9	2,6		
	-	243	258,2	310,1	-	-	-	26,9	-		
	-	241	-	311,5	-	-	-	45,7	-		
	-	241	256,9	311,5	14	28	HJ2240 E	45,7	3		
	-	260	-	339,3	-	-	-	57,5	-		
	-	260	280	339,3	18	33	HJ340	57,5	5,2		
	-	260	-	339,3	-	-	-	99	-		
	-	260	280	339,3	18	44,5	HJ2340	99	5,5		
<b>220</b>	-	250	262	297,3	14	27	HJ1044	19,3	2,2		
	-	270	-	334,3	-	-	-	38,1	-		
	-	270	285,5	334,3	15	27,5	HJ244	38,1	3,6		
	-	270	285,5	334,3	-	-	-	38,1	-		
	-	270	-	334,3	-	-	-	63,5	-		
	-	270	285,5	334,3	15	36,5	HJ2244	63,5	3,6		
	-	284	-	373,3	-	-	-	75,5	-		
	-	284	-	373,3	-	-	-	124	-		
<b>240</b>	-	270	282	317,3	14	27	HJ1048	20,7	2,4		
	-	295	-	367,3	-	-	-	51,5	-		
	-	295	313	367,3	16	29,5	HJ248	51,5	4,65		

## Single Row Cylindrical Roller Bearings

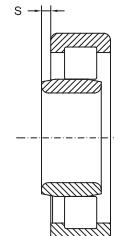


d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	s				grease	oil	
mm											
<b>240</b>	440	120	4	4	12,8	1430	2320	1300	1600	<b>NU2248 M</b>	
	500	95	5	5	8,9	1400	1930	1200	1500	<b>NU348 M</b>	
	500	155	5	5	17	2080	3150	1100	1400	<b>NU2348 M</b>	
<b>260</b>	400	65	4	4	10,5	660	1039	1500	1800	<b>NU1052 M</b>	
	480	80	5	5	5	1140	1630	1200	1500	<b>NU252 M</b>	
	480	80	5	5	-	1140	1630	1200	1500	<b>NJ252 M</b>	
	480	130	5	5	12,8	1760	2900	1100	1400	<b>NU2252 M</b>	
	540	102	6	6	9,4	1600	2200	1100	1400	<b>NU352 M</b>	
	540	165	6	6	18	2320	3550	1000	1300	<b>NU2352 M</b>	
<b>280</b>	420	65	4	4	10,5	680	1100	1400	1700	<b>NU1056 M</b>	
	500	80	5	5	7,5	1120	1660	1200	1500	<b>NU256 M</b>	
	500	80	5	5	-	1120	1660	1200	1500	<b>NJ256 M</b>	
	500	130	5	5	12,8	1760	2900	1100	1400	<b>NU2256 M</b>	
	580	108	6	6	22	1800	2500	1000	1300	<b>NU356 M</b>	
<b>300</b>	460	74	4	4	12	900	1430	1300	1600	<b>NU1060 M</b>	
	540	85	5	5	7,2	1400	2040	1100	1400	<b>NU260 M</b>	
	540	85	5	5	-	1400	2040	1100	1400	<b>NJ260 M</b>	
	540	140	5	5	14	2080	3400	1000	1300	<b>NU2260 M</b>	
	620	109	7,5	7,5	9,5	2080	3000	900	1100	<b>NU360 M</b>	
<b>320</b>	480	74	4	4	11,5	915	1500	1200	1500	<b>NU1064 M</b>	
	580	92	5	5	8,3	1600	2360	1000	1300	<b>NU264 M</b>	
	580	92	5	5	-	1600	2360	1000	1300	<b>NJ264 M</b>	

## Single Row Cylindrical Roller Bearings



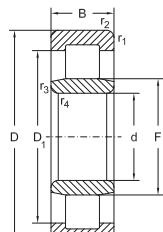
NJ+HJ



*Abutment and fillet dimensions see on page 210*

d	E	F	$d_1 \approx$	Dimensions				Designation	Thrust collar		Mass kg
				$D_1 \approx$	$B_2$	$B_3$	Bearing		Thrust collar		
<b>240</b>	-	295	-	367,3	-	-	-	<b>HJ1052</b>	85,9	-	
	-	310	-	405,3	-	-	-		96,2	-	
	-	310	-	405,3	-	-	-		157	-	
<b>260</b>	-	296	309,6	349,7	16	31,5	<b>HJ1052</b>	30,8	3,3		
	-	320	-	399,3	-	-	-		68,3	-	
	-	320	340	399,3	18	33	<b>HJ252</b>	68,3	6,2		
	-	320	-	399,3	-	-	-		112	-	
	-	336	-	437,3	-	-	-		120	-	
	-	336	-	437,3	-	-	-		195	-	
<b>280</b>	-	316	329,6	369,7	16	31,5	<b>HJ1056</b>	32,8	3,7		
	-	340	-	419,3	-	-	-		71,8	-	
	-	340	360	419,3	18	33	<b>HJ256</b>	71,8	6,5		
	-	340	-	419,3	-	-	-		117	-	
	-	362	-	469,3	-	-	-		147	-	
<b>300</b>	-	340	356	403,6	19	36	<b>HJ1060</b>	46,3	5,4		
	-	364	-	453,3	-	-	-		89,9	-	
	-	364	387	453,3	20	34,5	<b>HJ260</b>	89,9	8,4		
	-	364	-	453,3	-	-	-		148	-	
	-	388	-	506,7	-	-	-		168	-	
<b>320</b>	-	360	376	423,1	19	36	<b>HJ1064</b>	48,7	5,5		
	-	390	-	485,3	-	-	-		113	-	
	-	390	415	485,3	21	37	<b>HJ260</b>	113	10,2		

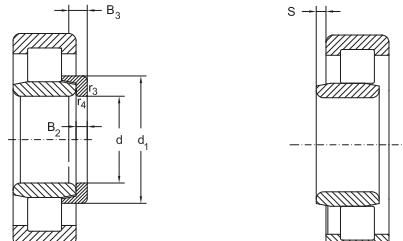
## Single Row Cylindrical Roller Bearings



NU

d mm	D mm	B mm	Dimensions			s ≈	Basical radial load dyn. $C_r$	stat. $C_{or}$	Speed limit		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	F				grease	oil	
<b>340</b>	520	82	5	5	12,5	1120	1830	1200	1400	<b>NU1068 M</b>	
<b>360</b>	540	82	5	5	12,5	1145	1900	1200	1400	<b>NU1072 M</b>	
<b>380</b>	560	82	5	5	12,5	1180	2000	1000	1300	<b>NU1076 M</b>	
<b>400</b>	600	90	5	5	13,5	1370	2320	950	1200	<b>NU1080 M</b>	
<b>420</b>	620	90	5	5	15	1400	2450	900	1100	<b>NU1084 M</b>	
<b>440</b>	650	94	6	6	9,8	1560	2750	850	1000	<b>NU1088 M</b>	
<b>460</b>	680	100	6	6	10,5	1660	3000	850	1000	<b>NU1092 M</b>	
<b>480</b>	650	78	5	5	6,8	1140	2240	900	1100	<b>NU1996 M</b>	
	700	100	5	5	15,9	1140	2240	900	1100	<b>NU1096 M</b>	
<b>500</b>	670	78	5	5	6,8	1140	2240	850	1000	<b>NU19/500 M</b>	
	720	100	6	6	10,5	1760	3200	800	950	<b>NU10/500 M</b>	
<b>560</b>	750	85	5	5	7,5	1430	2900	750	900	<b>NU19/560 M</b>	
	820	115	6	6	12,3	2700	5100	630	750	<b>NU10/560 M</b>	
<b>600</b>	870	118	6	6	13,9	2750	5050	580	480	<b>NU10/600 M</b>	
<b>630</b>	850	100	6	6	8,5	1830	3750	670	800	<b>NU19/630 M</b>	
<b>710</b>	950	106	6	6	9,3	2080	4400	600	700	<b>NU19/710 M</b>	

## Single Row Cylindrical Roller Bearings

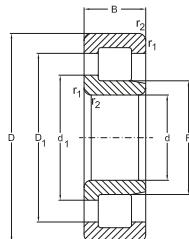


NU+HJ

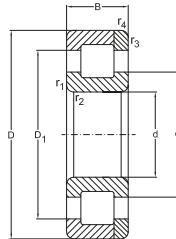
*Abutment and fillet dimensions see on page 210*

Dimensions	d	E	F	$d_1 \approx$	$D_1 \approx$	$B_2$	$B_3$	Thrust collar		Mass	
								Designation	Bearing	Thrust collar	
	kg										
<b>340</b>	-	385	403	456	21	39,5	HJ1068	65	7,1		
<b>360</b>	-	405	423	476,4	21	39,5	HJ1072	68,2	7,6		
<b>380</b>	-	425	-	496,7	-	-	-	71,2	-		
<b>400</b>	-	450	-	529,5	-	-	-	92,5	-		
<b>420</b>	-	470	-	549,5	-	-	-	96,2	-		
<b>440</b>	-	493	-	575,7	-	-	-	110	-		
<b>460</b>	-	516	-	601,5	-	-	-	129	-		
<b>480</b>	-	525	-	587	-	-	-	77,5	-		
	-	525	-	587	-	-	-	128	-		
<b>500</b>	-	545	-	606,8	-	-	-	80,4	-		
	-	556	-	641,7	-	-	-	139	-		
<b>560</b>	-	610	-	679,8	-	-	-	110	-		
	-	626	-	713	-	-	-	215	-		
<b>600</b>	-	667	-	779	-	-	-	240	-		
<b>630</b>	-	688	-	768,5	-	-	-	169	-		
<b>710</b>	-	774	-	860,6	-	-	-	219	-		

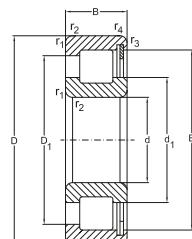
## Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



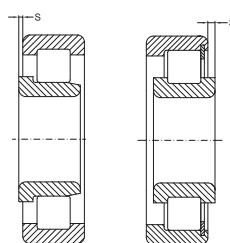
NC



NCF

d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
mm							
<b>20</b>	37	11	0,3	0,3	16	18,5	<b>NC2904 V</b>
	37	11	0,3	0,3	16	18,5	<b>NCF2904 V</b>
	42	16	0,6	0,3	33	39,7	<b>NC3004 V</b>
	42	16	0,6	0,3	33	39,7	<b>NCF3004 V</b>
<b>25</b>	42	11	0,3	0,3	18	22,5	<b>NC2905 V</b>
	42	11	0,3	0,3	18	22,5	<b>NCF2905 V</b>
	47	16	0,6	0,3	37,4	46,9	<b>NC3005 V</b>
	47	16	0,6	0,3	37,4	46,9	<b>NCF3005 V</b>
	62	24	1,1	-	68,2	82,8	<b>NJ2305 VH</b>
<b>30</b>	47	11	0,3	0,3	19,8	26	<b>NC2906 V</b>
	47	11	0,3	0,3	19,8	26	<b>NCF2906 V</b>
	55	19	1	0,4	49	63	<b>NC3006 V</b>
	55	19	1	0,4	49	63	<b>NCF3006 V</b>
	72	27	1	-	84	102	<b>NJ2306 VH</b>
<b>35</b>	55	13	0,6	0,3	31	40,5	<b>NC2907 V</b>
	55	13	0,6	0,3	31	40,5	<b>NCF2907 V</b>
	62	20	1	0,4	55	71,5	<b>NC3007 V</b>
	62	20	1	0,4	55	71,5	<b>NCF3007 V</b>
	80	31	1,5	-	108	124	<b>NJ2307 VH</b>
<b>40</b>	62	14	0,6	0,3	34	46,5	<b>NC2908 V</b>
	62	14	0,6	0,3	34	46,5	<b>NCF2908 V</b>
	68	21	1	0,4	66	87,4	<b>NC3008 V</b>

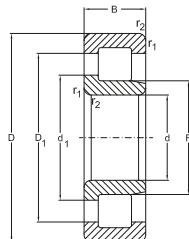
## Single Row Full Complement Cylindrical Roller Bearings



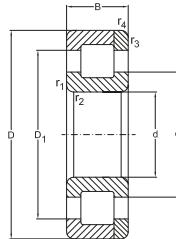
*Abutment and fillet dimensions see on page 210*

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	S ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
-	-	26,3	30,3	-	4800	9000	0,06	<b>NC2904 V</b>
32,3	-	26,3	30,3	0,5	4800	9000	0,05	<b>NCF2904 V</b>
-	-	27,5	34,5	-	4500	8400	0,12	<b>NC3004 V</b>
37,5	-	27,5	34,5	0,5	4500	8400	0,11	<b>NCF3004 V</b>
-	-	31,4	35,4	-	4000	7500	0,07	<b>NC2905 V</b>
37,45	-	31,4	35,4	0,5	4000	7500	0,06	<b>NCF2905 V</b>
-	-	36,3	49	-	3600	7000	0,13	<b>NC3005 V</b>
42,7	-	36,3	49	0,5	3600	7000	0,12	<b>NCF3005 VH</b>
-	31,71	36,3	49	1,7	3000	5300	0,40	<b>NJ2305 V</b>
-	-	36,5	40,5	-	3600	6700	0,08	<b>NC2906 V</b>
42,5	-	36,5	40,5	0,5	3600	6700	0,07	<b>NCF2906 V</b>
-	-	38,4	46,8	-	3200	5600	0,22	<b>NC3006 V</b>
49,6	-	38,4	46,8	0,8	3200	5600	0,20	<b>NCF3006 V</b>
-	38,34	43,3	56,5	1,8	1900	4000	0,56	<b>NJ2306 VH</b>
-	-	42,4	47,4	-	3000	5600	0,14	<b>NC2907 V</b>
49,9	-	42,4	47,4	0,5	3000	5600	0,12	<b>NCF2907 V</b>
-	-	43,6	52,6	-	2800	5300	0,27	<b>NC3007 V</b>
55,52	-	43,6	52,6	1	2800	5300	0,25	<b>NCF3007 V</b>
-	44,74	50,3	65,8	2	1600	3400	0,73	<b>NJ2307 VH</b>
-	-	48,3	53,9	-	2600	5000	0,16	<b>NC2908 V</b>
56,6	-	48,3	53,9	0,5	2600	5000	0,15	<b>NCF2908 V</b>
-	-	49,1	58,7	-	2400	4500	0,32	<b>NC3008 V</b>

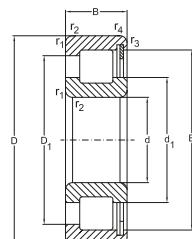
## Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



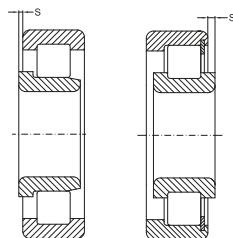
NC



NCF

d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
mm							
<b>40</b>	68	21	1	0,4	65	86	<b>NCF3008 V</b>
	90	33	1,5	-	145	184	<b>NJ2308 VH</b>
<b>45</b>	68	14	0,6	0,3	37	52	<b>NC2909 V</b>
	68	14	0,6	0,3	37	52	<b>NCF2909 V</b>
	75	23	1	0,4	81	110	<b>NC3009 V</b>
	75	23	1	0,4	81	110	<b>NCF3009 V</b>
	100	36	1,5	-	170	220	<b>NJ2309 VH</b>
<b>50</b>	72	14	0,6	0,3	39	56	<b>NC2910 V</b>
	72	14	0,6	0,3	39	56	<b>NCF2910 V</b>
	80	23	1	0,4	86	120	<b>NC3010 V</b>
	80	23	1	0,4	86	120	<b>NCF3010 V</b>
	110	40	2	-	198	250	<b>NJ2310 VH</b>
<b>55</b>	80	16	1	0,6	42	60	<b>NC2911 V</b>
	80	16	1	0,6	42	60	<b>NCF2911 V</b>
	90	26	1,1	0,6	105	152	<b>NC3011 V</b>
	90	26	1,1	0,6	105	152	<b>NCF3011 V</b>
	120	43	2	-	230	260	<b>NJ2311 VH</b>
<b>60</b>	85	16	1	0,6	52	78	<b>NC2912 V</b>
	85	16	1	0,6	52	78	<b>NCF2912 V</b>
	95	26	1,1	0,6	110	160	<b>NC3012 V</b>
	95	26	1,1	0,6	110	160	<b>NCF3012 V</b>
	130	46	2,1	-	260	352	<b>NJ2312 VH</b>

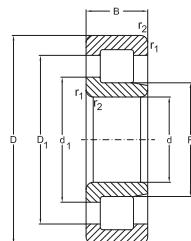
## Single Row Full Complement Cylindrical Roller Bearings



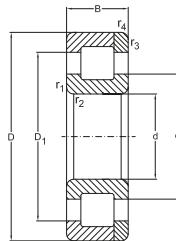
*Abutment and fillet dimensions see on page 210*

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	S ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
61,8	-	49	58,6	1	2400	4500	0,30	<b>NCF3008 V</b>
-	51,1	57,5	76	2,4	1400	3000	1,00	<b>NJ2308 VH</b>
-	-	53,6	59,2	-	2200	4500	0,20	<b>NC2909 V</b>
61,9	-	53,6	59,2	0,5	2200	4500	0,18	<b>NCF2909 V</b>
-	-	55	65	-	2000	4300	0,42	<b>NC3009 V</b>
68,5	-	55	65	1	2000	4300	0,40	<b>NCF3009 V</b>
-	56,13	62,5	81,8	2,4	1300	2800	1,35	<b>NJ2309 VH</b>
-	-	58,7	64,4	-	1900	4000	0,21	<b>NC2910 V</b>
67,1	-	58,7	64,4	0,5	1900	4000	0,18	<b>NCF2910 V</b>
-	-	58	68,8	-	1900	4000	0,45	<b>NC3010 V</b>
72,33	-	58	68,8	1	1900	4000	0,43	<b>NCF3010 V</b>
-	60,7	68,3	90,3	2,6	1600	3200	1,85	<b>NJ2310 VH</b>
-	-	64,2	70,2	-	1800	3800	0,30	<b>NC2911 V</b>
73,2	-	64,2	70,2	0,5	1800	3800	0,27	<b>NCF2911 V</b>
-	-	67,5	79,5	-	1600	3400	0,66	<b>NC3011 V</b>
83,7	-	67,5	79,5	1,2	1600	3400	0,63	<b>NCF3011 V</b>
-	67,1	75,5	98,6	2,6	1000	2200	2,30	<b>NJ2311 VH</b>
-	-	69,5	76,1	-	1600	3400	0,30	<b>NC2912 V</b>
79,3	-	69,5	76,1	0,5	1600	3400	0,28	<b>NCF2912 V</b>
-	-	70,9	82,9	-	1600	3200	0,71	<b>NC3012 V</b>
86,9	-	70,9	82,9	1,2	1600	3200	0,68	<b>NCF3012 V</b>
-	73,68	82,1	106	3	950	2000	2,83	<b>NJ2312 VH</b>

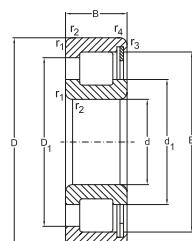
## Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



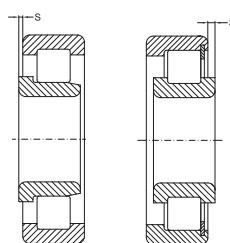
NC



NCF

d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
<b>65</b>	90	16	1	0,6	53,5	80	<b>NC2913 V</b>
	90	16	1	0,6	53,5	80	<b>NCF2913 V</b>
	100	26	1,1	0,6	117	175	<b>NC3013 V</b>
	100	26	1,1	0,6	117	175	<b>NCF3013 V</b>
	140	48	2,1	-	302	358	<b>NJ2313 VH</b>
<b>70</b>	100	19	1	0,6	77	118	<b>NC2914 V</b>
	100	19	1	0,6	77	118	<b>NCF2914 V</b>
	110	30	1,1	0,6	145	215	<b>NC3014 V</b>
	110	30	1,1	0,6	145	215	<b>NCF3014 V</b>
	150	51	2,1	-	335	455	<b>NJ2314 VH</b>
<b>75</b>	105	19	1	0,6	79,5	124	<b>NC2915 V</b>
	105	19	1	0,6	79,5	124	<b>NCF2915 V</b>
	115	30	1,1	0,6	154	224	<b>NC3015 V</b>
	115	30	1,1	0,6	154	224	<b>NCF3015 V</b>
	160	55	2,1	-	390	550	<b>NJ2315 VH</b>
<b>80</b>	110	19	1	0,6	81	128	<b>NC2916 V</b>
	110	19	1	0,6	81	128	<b>NCF2916 V</b>
	125	34	1,1	0,6	194	285	<b>NC3016 V</b>
	125	34	1,1	0,6	194	285	<b>NCF3016 V</b>
	170	58	2,1	-	455	550	<b>NJ2316 VH</b>
<b>85</b>	120	22	1,1	1	105	168	<b>NC2917 V</b>
	120	22	1,1	1	105	168	<b>NCF2917 V</b>
	130	34	1,1	0,6	195	295	<b>NC3017 V</b>

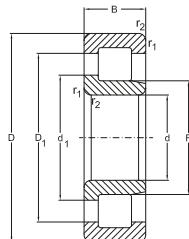
## Single Row Full Complement Cylindrical Roller Bearings



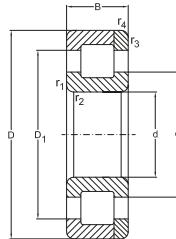
*Abutment and fillet dimensions see on page 210*

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	s ≈	n <sub>g</sub> <sub>grease</sub> [min <sup>-1</sup> ]	n <sub>g</sub> <sub>oil</sub> [kg]	Bearing	
-	-	73,7	80,3	-	1600	3400	0,33	<b>NC2913 V</b>
83,5	-	73,7	80,3	0,5	1600	3400	0,30	<b>NCF2913 V</b>
-	-	77,1	87,1	-	1400	3000	0,75	<b>NC3013 V</b>
93,1	-	77,1	87,1	1,2	1400	3000	0,72	<b>NCF3013 V</b>
-	80,71	89,4	117	3	900	1900	3,48	<b>NJ2313 VH</b>
-	-	80,5	88,5	-	1400	3000	0,52	<b>NC2914 V</b>
92,5	-	80,5	88,5	0,75	1400	3000	0,48	<b>NCF2914 V</b>
-	-	82,6	97,2	-	1300	2800	1,10	<b>NC3014 V</b>
102,1	-	82,6	97,2	1,5	1300	2800	1,05	<b>NCF3014 V</b>
-	84,22	93,8	121	3	850	1800	4,40	<b>NJ2314 VH</b>
-	-	85,6	93,6	-	1300	2800	0,55	<b>NC2915 V</b>
97,6	-	85,6	93,6	0,75	1300	2800	0,50	<b>NCF2915 V</b>
-	-	87	102	-	1200	2600	1,15	<b>NC3015 V</b>
106,5	-	87	102	1,5	1200	2600	1,10	<b>NCF3015 V</b>
-	91,25	100,8	132,5	3	750	1600	5,18	<b>NJ2315 VH</b>
-	-	90,7	98,7	-	1200	2600	0,57	<b>NC2916 V</b>
102,7	-	90,7	98,7	0,75	1200	2600	0,53	<b>NCF2916 V</b>
-	-	94,8	112	-	1100	2400	1,56	<b>NC3016 V</b>
117,2	-	94,8	112	1,8	1100	2400	1,50	<b>NCF3016 V</b>
-	98,3	109	141	4	700	1500	6,40	<b>NJ2316 VH</b>
-	-	99,1	109	-	1100	2400	0,79	<b>NC2917 V</b>
112,5	-	99,1	109	0,75	1100	2400	0,78	<b>NCF2917 V</b>
-	-	99,2	116	-	1100	2400	1,60	<b>NC3017 V</b>

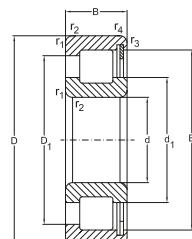
## Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



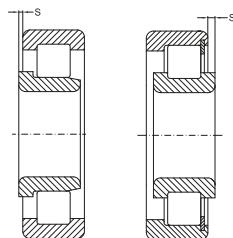
NC



NCF

d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
<b>85</b>	130	34	1,1	0,6	195	295	<b>NCF3017 V</b>
	180	60	3	-	482	695	<b>NJ2317 VH</b>
<b>90</b>	125	22	1,1	1	105	172	<b>NC2918 V</b>
	125	22	1,1	1	105	172	<b>NCF2918 V</b>
	140	37	1,5	1	227	348	<b>NC3018 V</b>
	140	37	1,5	1	227	348	<b>NCF3018 V</b>
	190	64	3	-	520	790	<b>NJ2318 VH</b>
<b>95</b>	130	22	1,1	1	108	180	<b>NC2919 V</b>
	130	22	1,1	1	108	180	<b>NCF2919 V</b>
	145	37	1,5	1	230	360	<b>NC3019 V</b>
	145	37	1,5	1	230	360	<b>NCF3019 V</b>
<b>100</b>	140	24	1,1	1	132	220	<b>NC2920 V</b>
	140	24	1,1	1	132	220	<b>NCF2920 V</b>
	150	37	1,5	1	242	375	<b>NC3020 V</b>
	150	37	1,5	1	242	375	<b>NCF3020 V</b>
	215	73	3	-	704	1030	<b>NJ2320 VH</b>
<b>110</b>	150	24	1,1	1	140	243	<b>NC2922 V</b>
	150	24	1,1	1	140	243	<b>NCF2922 V</b>
	170	45	2	1	325	510	<b>NC3022 V</b>
	170	45	2	1	325	510	<b>NCF3022 V</b>
	240	80	3	-	830	1060	<b>NJ2322 VH</b>
<b>120</b>	165	27	1,1	1	172	287	<b>NC2924 V</b>
	165	27	1,1	1	172	287	<b>NCF2924 V</b>

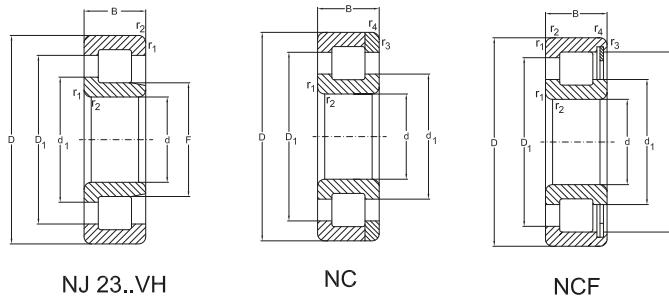
## Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	s ≈	n <sub>g</sub> <sub>grease</sub> [min <sup>-1</sup> ]	n <sub>g</sub> <sub>oil</sub> [kg]	Bearing	
121,6	-	99,2	116	1,8	1100	2200	1,55	<b>NCF3017 V</b>
-	107,02	117,4	151,5	4	900	1800	7,3	<b>NJ2317 VH</b>
-	-	102	111	-	1100	2400	0,9	<b>NC2918 V</b>
115,6	-	102	111	0,75	1100	2400	0,82	<b>NCF2918 V</b>
-	-	106,2	125	-	1000	2200	2,12	<b>NC3018 V</b>
130,3	-	106,2	125	2	1000	2200	2,05	<b>NCF3018 V</b>
-	108,8	121	156	4	670	1400	8,75	<b>NJ2318 VH</b>
-	-	107	117	-	1000	2200	0,94	<b>NC2919 V</b>
120,4	-	107	117	0,75	1000	2200	0,86	<b>NCF2919 V</b>
-	-	111	129	2	950	2000	2,28	<b>NC3019 V</b>
135,1	-	111	129	4,5	950	2000	2,15	<b>NCF3019 V</b>
-	-	114	124	-	1000	2200	1,25	<b>NC2920 V</b>
129	-	114	124	0,75	1000	2200	1,15	<b>NCF2920 V</b>
-	-	116	134	-	950	2000	2,29	<b>NC3020 V</b>
139,9	-	116	134	2	950	2000	2,20	<b>NCF3020 V</b>
-	122,8	136	176	4,5	600	1200	13,00	<b>NJ2320 VH</b>
-	-	126	137	-	900	1900	1,35	<b>NC2922 V</b>
141,3	-	126	137	0,75	900	1900	1,25	<b>NCF2922 V</b>
-	-	129	150	-	900	1800	3,79	<b>NC3022 V</b>
157	-	129	150	3	900	1800	3,65	<b>NCF3022 V</b>
-	134,3	151	198	5	700	1400	17,80	<b>NJ2322 VH</b>
-	-	136	149	-	850	1800	1,88	<b>NC2924 V</b>
154,3	-	136	149	0,75	850	1800	1,70	<b>NCF2924 V</b>

## Single Row Full Complement Cylindrical Roller Bearings



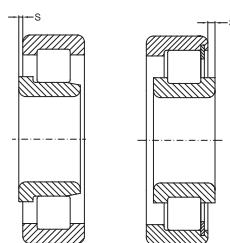
NJ 23..VH

NC

NCF

d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	
<b>120</b>	180	46	2	1	340	550	<b>NC3024 V</b>
	180	46	2	1	340	550	<b>NCF3024 V</b>
	260	86	3	-	920	1300	<b>NJ2324 VH</b>
<b>130</b>	180	30	1,5	1,1	205	350	<b>NC2926 V</b>
	180	30	1,5	1,1	205	350	<b>NCF2926 V</b>
	200	52	2	1	415	620	<b>NC3026 V</b>
	200	52	2	1	415	620	<b>NCF3026 V</b>
	280	93	4	-	1080	1660	<b>NJ2326 VH</b>
<b>140</b>	190	30	1,5	1,1	220	375	<b>NC2928 V</b>
	190	30	1,5	1,1	220	375	<b>NCF2928 V</b>
	210	53	2	1	440	680	<b>NC3028 V</b>
	210	53	2	1	440	680	<b>NCF3028 V</b>
	300	102	4	-	1250	1910	<b>NJ2328 VH</b>
<b>150</b>	190	20	1	1,1	108	185	<b>NC1830 V</b>
	190	20	1	1,1	108	185	<b>NCF1830 V</b>
	210	36	2	1,1	286	497	<b>NC2930 V</b>
	210	36	2	1,1	286	497	<b>NCF2930 V</b>
	225	56	2,1	1,1	530	880	<b>NC3030 V</b>
	225	56	2,1	1,1	530	880	<b>NCF3030 V</b>
	320	108	4	-	1450	2240	<b>NJ2330 VH</b>
<b>160</b>	200	20	1,1	1,1	112	199	<b>NC1832 V</b>
	200	20	1,1	1,1	112	199	<b>NCF1832 V</b>
	220	36	2	1,1	297	524	<b>NC2932 V</b>

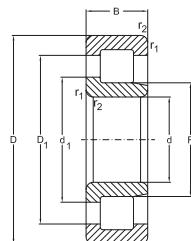
## Single Row Full Complement Cylindrical Roller Bearings



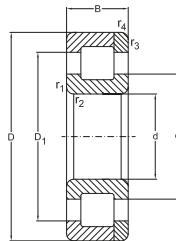
*Abutment and fillet dimensions see on page 210*

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	S ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
-	-	139	160,5	-	800	1700	4,10	<b>NC3024 V</b>
167,9	-	139	160,5	3,5	800	1700	3,95	<b>NCF3024 V</b>
-	147,7	164	211	5,5	530	1000	22,30	<b>NJ2324 VH</b>
-	-	147	161	-	750	1600	2,50	<b>NC2926 V</b>
167,1	-	147	161	0,75	750	1600	2,30	<b>NCF2926 V</b>
-	-	148,6	175	-	700	1500	6,00	<b>NC3026 V</b>
186,5	-	148,6	175	3,5	700	1500	5,80	<b>NCF3026 V</b>
-	157,95	174,1	229,6	6	500	950	28	<b>NJ2326 VH</b>
-	-	159	173	-	700	1500	2,59	<b>NC2928 V</b>
180	-	159	173	0,75	700	1500	2,40	<b>NCF2928 V</b>
-	-	162,7	189,1	-	670	1400	6,21	<b>NC3028 V</b>
198,2	-	162,7	189,1	3,5	670	1400	6,10	<b>NCF3028 V</b>
-	168,5	184,7	245,3	6,5	450	850	35,5	<b>NJ2328 VH</b>
-	-	163	176	1,5	700	1500	1,54	<b>NC1830 V</b>
159,5	-	163	176	1,5	700	1500	1,30	<b>NCF1830 V</b>
-	-	171	188	-	670	1400	4	<b>NC2930 V</b>
195,5	-	171	188	0,8	670	1400	3,85	<b>NCF2930 V</b>
-	-	174	203	-	630	1300	7,72	<b>NC3030 V</b>
211,7	-	174	203	3,5	630	1300	7,50	<b>NCF3030 V</b>
-	182,5	203	261	6,5	430	800	42,5	<b>NJ2330 VH</b>
-	-	173	185	1,5	670	1400	1,60	<b>NC1832 V</b>
169	-	173	185	1,5	670	1400	1,45	<b>NCF1832 V</b>
-	-	181	198	-	630	1300	4	<b>NC2932 V</b>

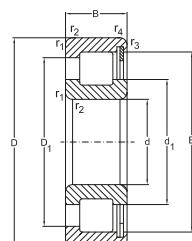
## Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



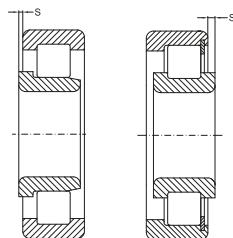
NC



NCF

d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
mm							
<b>160</b>	220	36	2	1,1	297	524	<b>NCF2932 V</b>
	240	60	2,1	1,1	580	970	<b>NC3032 V</b>
	240	60	2,1	1,1	580	970	<b>NCF3032 V</b>
	340	114	4	-	1630	2550	<b>NJ2332 VH</b>
<b>170</b>	215	22	1,1	1,1	142	245	<b>NC1834 V</b>
	215	22	1,1	1,1	142	245	<b>NCF1834 V</b>
	230	36	2	1,1	308	552	<b>NC2934 V</b>
	230	36	2	1,1	308	552	<b>NCF2934 V</b>
	260	67	2,1	1,1	728	1230	<b>NC3034 V</b>
	260	67	2,1	1,1	728	1230	<b>NCF3034 V</b>
	360	120	3	-	1760	2400	<b>NJ2334 VH</b>
<b>180</b>	225	22	1,1	1,1	147	275	<b>NC1836 V</b>
	225	22	1,1	1,1	147	275	<b>NCF1836 V</b>
	250	42	2	1,1	391	690	<b>NC2936 V</b>
	250	42	2	1,1	391	690	<b>NCF2936 V</b>
	280	74	2,1	2,1	820	1400	<b>NC3036 V</b>
	280	74	2,1	2,1	820	1400	<b>NCF3036 V</b>
	300	126	3	-	1900	2700	<b>NJ2336 VH</b>
<b>190</b>	240	24	1,5	1,5	172	320	<b>NC1838 V</b>
	240	24	1,5	1,5	172	320	<b>NCF1838 V</b>
	260	42	2	1,1	440	782	<b>NC2938 V</b>
	260	42	2	1,1	440	782	<b>NCF2938 V</b>
	290	75	2,1	2,1	850	1450	<b>NC3038 V</b>

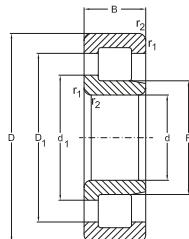
## Single Row Full Complement Cylindrical Roller Bearings



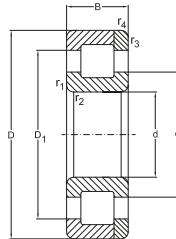
*Abutment and fillet dimensions see on page 210*

Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	S ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
205,7	-	181	198	0,8	630	1300	4,05	<b>NCF2932 V</b>
-	-	184,8	214,8	-	600	1100	9,26	<b>NC3032 V</b>
225,1	-	184,8	214,8	4	600	1100	9,10	<b>NCF3032 V</b>
-	196,55	216,7	286	7	400	750	48,80	<b>NJ2332 VH</b>
-	-	185	200	1,5	630	1300	2	<b>NC1834 V</b>
204,5	-	185	200	1,5	630	1300	1,85	<b>NCF1834 V</b>
-	-	192	208	-	600	1200	4,50	<b>NC2934 V</b>
216	-	192	208	0,8	600	1200	4,25	<b>NCF2934 V</b>
-	-	198	232	-	560	1000	13,70	<b>NC3034 V</b>
243,2	-	198	232	4	560	1000	12,50	<b>NCF3034 V</b>
-	203,56	224,5	296,4	7	450	800	59,20	<b>NJ2334 VH</b>
-	-	196	211	1,5	600	1200	2,20	<b>NC1836 V</b>
215,2	-	196	211	1,5	600	1200	1,95	<b>NCF1836 V</b>
-	-	203	223	-	560	1100	6,40	<b>NC2936 V</b>
232	-	203	223	1	560	1100	6,25	<b>NCF2936 V</b>
-	-	212	249	-	560	1100	17,10	<b>NC3036 V</b>
260,5	-	212	249	5	560	1100	16,50	<b>NCF3036 V</b>
-	221,74	242,6	314,6	9	400	700	69,60	<b>NJ2336 VH</b>
-	-	208	224	1,8	560	1100	2,70	<b>NC1838 V</b>
229	-	208	224	1,8	560	1100	2,45	<b>NCF1838 V</b>
-	-	212	236	-	560	1100	6,80	<b>NC2938 V</b>
244	-	212	236	1	560	1100	6,55	<b>NCF2938 V</b>
-	-	222	258	-	530	1000	17,9	<b>NC3038 V</b>

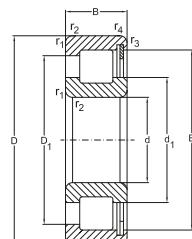
## Single Row Full Complement Cylindrical Roller Bearings



NJ 23..VH



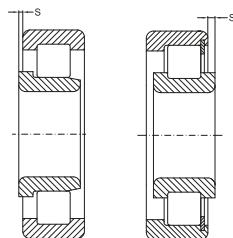
NC



NCF

d	D	Dimensions		Basical radial load		Designation	
		B	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	
mm							
<b>190</b>	290	75	2,1	2,1	800	1290	<b>NCF3038 V</b>
	400	132	4	-	2080	2900	<b>NJ2338 VH</b>
<b>200</b>	250	24	1,5	1,5	176	335	<b>NC1840 V</b>
	250	24	1,5	1,5	176	335	<b>NCF1840 V</b>
	280	48	2,1	1,5	528	938	<b>NC2940 V</b>
	280	48	2,1	1,5	528	938	<b>NCF2940 V</b>
	310	82	2,1	2,1	990	1750	<b>NC3040 V</b>
	310	82	2,1	2,1	990	1750	<b>NCF3040 V</b>
	420	138	5	-	2290	3680	<b>NJ2340 VH</b>
<b>220</b>	270	24	1,5	1,5	183	350	<b>NC1844 V</b>
	270	24	1,5	1,5	183	350	<b>NCF1844 V</b>
	300	48	2,1	1,5	550	1030	<b>NC2944 V</b>
	300	48	2,1	1,5	550	1030	<b>NCF2944 V</b>
	340	90	3	3	1190	2100	<b>NC3044 V</b>
	340	90	3	3	1190	2100	<b>NCF3044 V</b>
<b>240</b>	300	28	2	2	260	510	<b>NC1848 V</b>
	300	28	2	2	260	510	<b>NCF1848 V</b>
	320	48	2,1	1,5	583	1120	<b>NC2948 V</b>
	320	48	2,1	1,5	583	1120	<b>NCF2948 V</b>
	360	92	3	3	1250	2240	<b>NC3048 V</b>
	360	92	3	3	1250	2240	<b>NCF3048 V</b>
<b>260</b>	320	28	2	2	270	550	<b>NC1852 V</b>
	320	28	2	2	270	550	<b>NCF1852 V</b>

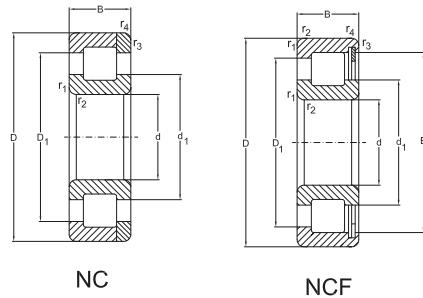
## Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

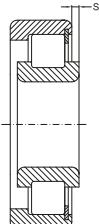
Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	s ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
270	-	222	258	6	530	1000	17,00	<b>NCF3038 V</b>
-	224,6	247,6	327	7	400	700	80,00	<b>NJ2338 VH</b>
-	-	216	233	1,8	560	1100	3	<b>NC1840 V</b>
237,5	-	216	233	1,8	560	1100	2,60	<b>NCF1840 V</b>
-	-	227	253	-	530	1000	9,50	<b>NC2940 V</b>
262	-	227	253	3	530	1000	9,15	<b>NCF2940 V</b>
-	-	227	276	-	450	800	23,00	<b>NC3040 V</b>
287,75	-	227	276	6,5	450	800	22,50	<b>NCF3040 V</b>
-	238,65	263,2	347,5	9	320	600	91,60	<b>NJ2340 VH</b>
-	-	237	253	1,8	530	1000	3,35	<b>NC1844 V</b>
258	-	237	253	1,8	530	1000	2,85	<b>NCF1844 V</b>
-	-	248	274	-	480	900	10,90	<b>NC2944 V</b>
283	-	248	274	2,5	480	900	9,90	<b>NCF2944 V</b>
-	-	254,7	297,9	-	430	850	30,50	<b>NC3044 V</b>
312,7	-	254,7	297,9	7	430	850	29,50	<b>NCF3044 V</b>
-	-	261	281	1,8	480	900	5,30	<b>NC1848 V</b>
287	-	261	281	1,8	480	900	4,40	<b>NCF1848 V</b>
-	-	261	296	-	450	850	12,00	<b>NC2948 V</b>
303	-	261	296	2,5	450	850	11,00	<b>NCF2948 V</b>
-	-	278	322	-	430	800	33,00	<b>NC3048 V</b>
335,6	-	278	322	7	430	800	32,00	<b>NCF3048 V</b>
-	-	281	301	1,8	430	800	5,55	<b>NC1852 V</b>
307,2	-	281	301	1,8	430	800	4,75	<b>NCF1852 V</b>

## Single Row Full Complement Cylindrical Roller Bearings



d mm	D mm	B mm	Dimensions		Basical radial load		Designation
			r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	
mm							
<b>260</b>	360	60	2,1	1,5	737	1410	<b>NC2952 V</b>
	360	60	2,1	1,5	737	1410	<b>NCF2952 V</b>
	400	104	4	4	1600	2920	<b>NC3052 V</b>
	400	104	4	4	1600	2920	<b>NCF3052 V</b>
<b>280</b>	350	33	2	2	330	650	<b>NC1856 V</b>
	350	33	2	2	330	650	<b>NCF1856 V</b>
	380	60	2,1	1,5	897	1710	<b>NC2956 V</b>
	380	60	2,1	1,5	897	1710	<b>NCF2956 V</b>
	420	106	4	4	1650	3100	<b>NC3056 V</b>
	420	106	4	4	1650	3100	<b>NCF3056 V</b>
<b>300</b>	380	38	2,1	2,1	418	850	<b>NC1860 V</b>
	380	38	2,1	2,1	418	850	<b>NCF1860 V</b>
	420	72	3	3	1120	2170	<b>NC2960 V</b>
	420	72	3	3	1120	2170	<b>NCF2960 V</b>
<b>320</b>	400	38	2,1	2,1	440	852	<b>NC1864 V</b>
	400	38	2,1	2,1	440	852	<b>NCF1864 V</b>
	440	72	3	3	1140	2300	<b>NC2964 V</b>
	440	72	3	3	1140	2300	<b>NCF2964 V</b>
<b>340</b>	420	38	2,1	2,1	446	900	<b>NC1868 V</b>
	420	38	2,1	2,1	446	900	<b>NCF1868 V</b>
	460	72	3	3	1190	2430	<b>NC2968 V</b>
	460	72	3	3	1190	2430	<b>NCF2968</b>

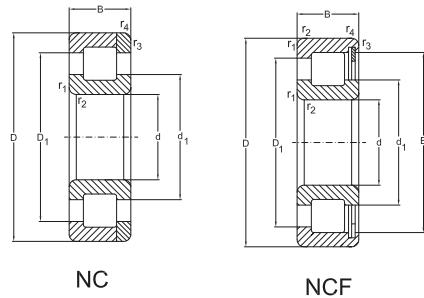
## Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

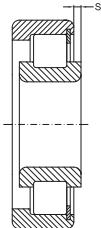
Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	s ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
-	-	294	321	-	400	750	19,30	<b>NC2952 V</b>
333,7	-	294	321	5	400	750	18,50	<b>NCF2952 V</b>
-	-	304,1	358,1	-	380	700	47,50	<b>NC3052 V</b>
373,5	-	304,1	358,1	8	380	700	46,50	<b>NCF3052 V</b>
-	-	305	327	2,5	400	750	8,00	<b>NC1856 V</b>
334	-	305	327	2,5	400	750	7,10	<b>NCF1856 V</b>
-	-	305	346	-	380	700	21,10	<b>NC2956 V</b>
362,7	-	319	346	4	380	700	20,00	<b>NCF2956 V</b>
-	-	324	375	-	320	560	52,5	<b>NC3056 V</b>
391	-	324	375	9	320	560	50	<b>NCF3056 V</b>
-	-	329	355	3	360	670	11,50	<b>NC1860 V</b>
363	-	329	355	3	360	670	10,00	<b>NCF1860 V</b>
-	-	342	375	-	340	630	32,30	<b>NC2960 V</b>
390,5	-	342	375	5	340	630	31,50	<b>NCF2960 V</b>
-	-	349	375	3	340	630	11,30	<b>NC1864 V</b>
383	-	349	375	3	340	630	10,50	<b>NCF1864 V</b>
-	-	363	395	-	320	600	34,00	<b>NC2964 V</b>
411	-	363	395	5	320	600	33,00	<b>NCF2964 V</b>
-	-	369	395	3	320	600	12,80	<b>NC1868 V</b>
403	-	369	395	3	320	600	11,00	<b>NCF1868 V</b>
-	-	383	415	-	300	560	36,00	<b>NC2968 V</b>
431	-	383	415	3	300	560	35,00	<b>NCF2968</b>

## Single Row Full Complement Cylindrical Roller Bearings



d	D	B	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
mm							
<b>360</b>	440	38	2,1	2,1	452	950	<b>NC1872 V</b>
	440	38	2,1	2,1	452	950	<b>NCF1872 V</b>
	480	72	3	3	1230	2580	<b>NC2972 V</b>
	480	72	3	3	1230	2580	<b>NCF2972 V</b>
<b>380</b>	480	46	2,1	2,1	627	1230	<b>NC1876 V</b>
	480	46	2,1	2,1	627	1230	<b>NCF1876 V</b>
	520	82	4	4	1570	3000	<b>NC2976 V</b>
	520	82	4	4	1570	3000	<b>NCF2976 V</b>
<b>400</b>	500	46	2,1	2,1	627	1280	<b>NC1880 V</b>
	500	46	2,1	2,1	627	1280	<b>NCF1880 V</b>
	540	82	4	4	1650	3420	<b>NC2980 V</b>
	540	82	4	4	1650	3420	<b>NCF2980 V</b>
<b>420</b>	520	46	2,1	2,1	660	1340	<b>NC1884 V</b>
	520	46	2,1	2,1	660	1340	<b>NCF1884 V</b>
	520	60	2,1	2,1	945,6	2329	<b>NCF2884 V</b>
	560	82	4	4	1650	3500	<b>NC2984 V</b>
	560	82	4	4	1650	3500	<b>NCF2984 V</b>
<b>440</b>	540	46	2,1	2,1	670	1405	<b>NC1888 V</b>
	540	46	2,1	2,1	670	1405	<b>NCF1888 V</b>
	600	95	4	4	2010	4270	<b>NC2988 V</b>
	600	95	4	4	2010	4270	<b>NCF2988 V</b>
<b>460</b>	580	56	3	3	913	1850	<b>NC1892 V</b>
	580	56	3	3	913	1850	<b>NCF1892 V</b>

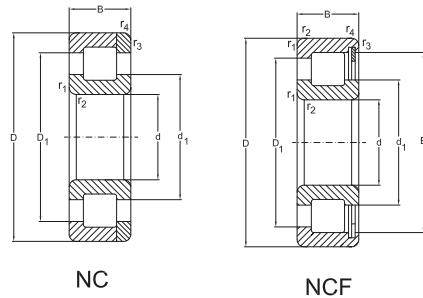
## Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

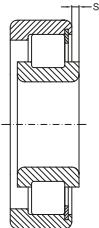
Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	s ≈	n <sub>g</sub> <sub>grease</sub>	n <sub>g</sub> <sub>oil</sub>	Bearing	
					[min <sup>-1</sup> ]		[kg]	
-	-	389	415	3	300	560	12,40	<b>NC1872 V</b>
423,3	-	389	415	3	300	560	12,00	<b>NCF1872 V</b>
-	-	403	436	-	280	530	36,80	<b>NC2972 V</b>
451,5	-	403	436	5	280	530	36,50	<b>NCF2972 V</b>
-	-	416	448	3,5	280	530	19,90	<b>NC1876 V</b>
458	-	416	448	3,5	280	530	19,50	<b>NCF1876 V</b>
-	-	427	473	-	260	500	53,50	<b>NC2976 V</b>
488	-	427	473	5	260	500	52,50	<b>NCF2976 V</b>
-	-	433	465	3,5	260	500	21,20	<b>NC1880 V</b>
475	-	433	465	3,5	260	500	20,50	<b>NCF1880 V</b>
-	-	450	496	-	240	480	55	<b>NC2980 V</b>
511	-	450	496	5	240	480	54,50	<b>NCF2980 V</b>
-	-	457	489	3,5	240	480	21,60	<b>NC1884 V</b>
499	-	447	488	3,5	240	480	21,00	<b>NCF1884 V</b>
499	-	457,4	488,6	3	240	480	28,50	<b>NCF2884 V</b>
-	-	463	509	-	220	450	57,70	<b>NC2984 V</b>
524	-	463	509	5	220	450	57,00	<b>NCF2984 V</b>
-	-	474	506	3,5	220	450	22,60	<b>NC1888 V</b>
516	-	474	506	3,5	220	450	22,00	<b>NCF1888 V</b>
-	-	502	545	-	200	430	81,10	<b>NC2988 V</b>
565,5	-	502	545	6	200	430	80,50	<b>NCF2988 V</b>
-	-	501	541	5	200	430	34,80	<b>NC1892 V</b>
533	-	501	541	5	200	430	34,00	<b>NCF1892 V</b>

## Single Row Full Complement Cylindrical Roller Bearings



d	D	B	Dimensions		Basical radial load		Designation
			$r_1, r_2$ min.	$r_3, r_4$ min.	dyn. $C_r$	stat. $C_{0r}$	
mm						kN	
<b>460</b>	620	95	4	4	2050	4420	<b>NC2992 V</b>
	620	95	4	4	2050	4420	<b>NCF2992 V</b>
<b>480</b>	600	56	3	3	935	1920	<b>NCF1896 V</b>
	650	100	5	5	2290	4950	<b>NCF2996 V</b>
<b>500</b>	620	56	3	3	952	2120	<b>NCF18/500 V</b>
	670	100	5	5	2380	5240	<b>NCF29/500 V</b>
<b>530</b>	650	56	3	3	990	2110	<b>NCF18/530 V</b>
<b>560</b>	680	56	3	3	1020	2230	<b>NCF18/560 V</b>
<b>600</b>	730	60	3	3	1050	2350	<b>NCF18/600 V</b>
<b>630</b>	780	69	4	4	1250	2800	<b>NCF18/630 V</b>
<b>670</b>	820	69	4	4	1300	3000	<b>NCF18/670 V</b>
<b>710</b>	870	74	4	4	1540	3550	<b>NCF18/710 V</b>
<b>750</b>	920	78	5	5	1760	4030	<b>NCF18/750 V</b>

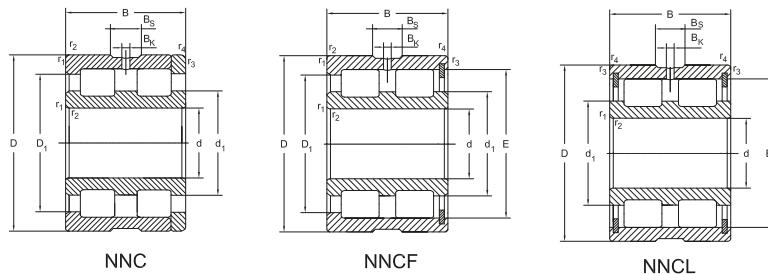
## Single Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

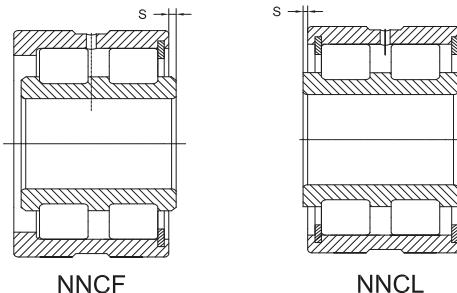
Dimensions					Speed Ratings		Mass	Designation
E ≈	F ≈	d <sub>1</sub> ≈	D <sub>1</sub> ≈	s ≈	n <sub>g</sub> <sub>grease</sub> [min <sup>-1</sup> ]	n <sub>g</sub> <sub>oil</sub> [kg]	Bearing	
-	-	516	558	-	190	400	83,90	<b>NC2992 V</b>
579	-	516	558	6	190	400	83,50	<b>NCF2992 V</b>
573,5	-	522	561	5	190	400	35,50	<b>NCF1896 V</b>
606	-	538	584	-	180	380	98,00	<b>NCF2996 V</b>
594	-	542	582	5	180	380	36,50	<b>NCF18/500 V</b>
634,5	-	567	612	7	170	360	100,00	<b>NCF29/500 V</b>
624,5	-	573	612	5	170	360	38,50	<b>NCF18/530 V</b>
655	-	603	643	5	160	340	40,50	<b>NCF18/560 V</b>
696	-	644	684	7	150	320	51,50	<b>NCF18/600 V</b>
739	-	681	725	8	140	300	72,50	<b>NCF18/630 V</b>
783	-	725	769	8	130	280	76,50	<b>NCF18/670 V</b>
831	-	767	815	8	120	260	92,50	<b>NCF18/710 V</b>
880	-	811	863	8	110	240	110,00	<b>NCF18/750 V</b>

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
				kN		[min <sup>-1</sup> ]		
<b>25</b>	47	30	0,6	55	76,4	3800	7000	<b>NNCF5005 V</b>
<b>30</b>	55	34	1	73,7	105	3200	6000	<b>NNCF5006 V</b>
<b>35</b>	62	36	1	88	131	2800	5300	<b>NNCF5007 V</b>
<b>40</b>	68	38	1	105	159	2400	4800	<b>NNCF5008 V</b>
<b>45</b>	75	40	1	128	195	2000	4300	<b>NNCF5009 V</b>
<b>50</b>	80	40	1	132	206	1900	4000	<b>NNCF5010 V</b>
<b>55</b>	90	46	1,1	176	294	1600	3400	<b>NNCF5011 V</b>
<b>60</b>	85	25	1	76,5	134	1700	3400	<b>NNC4912 V</b>
	85	25	1	76,5	134	1700	3400	<b>NNCF4912 V</b>
	85	25	1	76,5	134	1700	3400	<b>NNCL4912 V</b>
	95	46	1,1	183	305	1600	3400	<b>NNCF5012 V</b>
<b>65</b>	100	46	1,1	194	331	1400	3000	<b>NNCF5013 V</b>
<b>70</b>	100	30	1	103	188	1400	3000	<b>NNC4914 V</b>
	100	30	1	103	188	1400	3000	<b>NNCF4914 V</b>
	100	30	1	103	188	1400	3000	<b>NNCL4914 V</b>
	110	54	1,1	220	361	1300	2800	<b>NNCF5014 V</b>
<b>80</b>	110	30	1	110	210	1200	2600	<b>NNC4916 V</b>
	110	30	1	110	210	1200	2600	<b>NNCF4916 V</b>

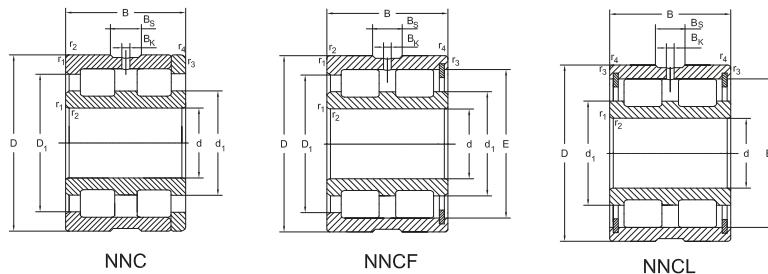
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

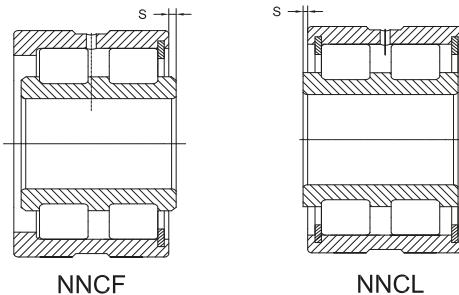
d	E	Dimensions					Bearing	Mass [kg]
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$		
<b>25</b>	42,7	33,1	40,3	4,5	3	1	0,23	
<b>30</b>	49,8	38,6	47	4,5	3	1	0,35	
<b>35</b>	55,7	43,7	52,7	4,5	3	1	0,46	
<b>40</b>	61,9	49,1	58,7	4,5	3	1	0,56	
<b>45</b>	69,8	55,4	66,2	4,5	3	1	0,70	
<b>50</b>	72,9	58,5	69,3	4,5	3	1	0,75	
<b>55</b>	83,7	67,6	79,7	4,5	3,5	1	1,15	
<b>60</b>	-	69,5	76,5	4,5	3,5	-	0,48	
		78,9	69,5	76,5	4,5	3,5	1	0,46
		78,9	69,5	76,5	4,5	3,5	1	0,46
		86,9	70,9	82,9	4,5	3,5	1	1,25
<b>65</b>	93,3	77,3	89,3	4,5	3,5	1	1,30	
<b>70</b>	-	82	89	4,5	3,5	-	0,8	
		92,3	82	89	4,5	3,5	1	0,79
		92,3	82	89	4,5	3,5	1	0,79
		101	81,8	96,2	5	3,5	1,1	1,85
<b>80</b>	-	90,5	98	5	3,5	-	0,9	
		101,2	90,5	98	5	3,5	1	0,88

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>80</b>	110	30	1	110	210	1200	2600	<b>NNCL4916 V</b>
	125	60	1,1	286	469	1100	2400	<b>NNCF5016 V</b>
<b>90</b>	125	35	1,1	146	292	1100	2300	<b>NNC4918 V</b>
	125	35	1,1	146	292	1100	2300	<b>NNCF4918 V</b>
	125	35	1,1	146	292	1100	2300	<b>NNCL4918 V</b>
	140	67	1,5	369	635	1000	2200	<b>NNCF5018 V</b>
<b>100</b>	140	40	1,1	190	390	950	2000	<b>NNC4920 V</b>
	140	40	1,1	190	390	950	2000	<b>NNCF4920 V</b>
	140	40	1,1	190	390	950	2000	<b>NNCL4920 V</b>
	150	67	1,5	391	690	950	2000	<b>NNCF5020 V</b>
<b>110</b>	150	40	1,1	197	420	900	1900	<b>NNC4922 V</b>
	150	40	1,1	197	420	900	1900	<b>NNCF4922 V</b>
	150	40	1,1	197	420	900	1900	<b>NNCL4922 V</b>
	170	80	2	528	957	850	1800	<b>NNCF5022 V</b>
<b>120</b>	165	45	1,1	220	465	800	1700	<b>NNC4924 V</b>
	165	45	1,1	220	465	800	1700	<b>NNCF4924 V</b>
	165	45	1,1	220	465	800	1700	<b>NNCL4924 V</b>
	180	80	2	561	1050	800	1700	<b>NNCF5024 V</b>
<b>130</b>	180	50	1,5	255	540	750	1600	<b>NNC4926 V</b>

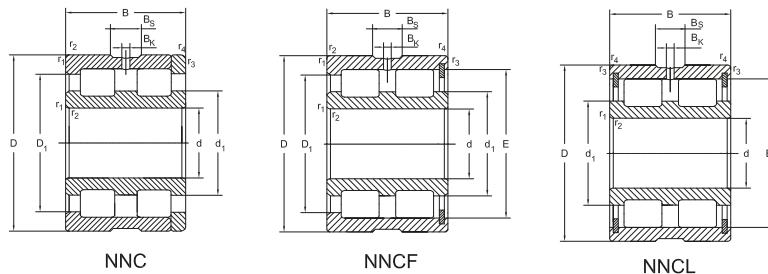
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

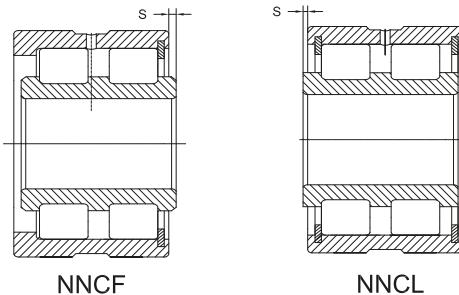
d	E	Dimensions						Mass [kg]
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$	Bearing	
<b>80</b>	101,2	90,5	98	5	3,5	1	0,88	
	117,2	94,8	112	5	3,5	2,5	2,60	
<b>90</b>	-	103,5	111,5	5	3,5	-	1,4	
	115,5	103,5	111,5	5	3,5	1,5	1,37	
	115,5	103,5	111,5	5	3,5	1,5	1,37	
	130,3	106	125	5	3,5	2,5	3,75	
<b>100</b>	-	116,5	125,5	5	3,5	-	2,1	
	130	116,5	125,5	5	3,5	2	2,0	
	130	116,5	125,5	5	3,5	2	2,0	
	140	116	134	6	3,5	2,5	4,05	
<b>110</b>	-	125	134	6	3,5	-	2,3	
	138,6	125	134	6	3,5	2	2,2	
	138,6	125	134	6	3,5	2	2,2	
	157	128	150	6	3,5	2,5	6,60	
<b>120</b>	-	139	149	6	3,5	-	3,2	
	154	139	149	6	3,5	3	3,0	
	154	139	149	6	3,5	3	3,0	
	168	139	161	6	3,5	2,5	7,10	
<b>130</b>	-	149,5	160,5	6	3,5	-	4,2	

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>130</b>	180	50	1,5	255	540	750	1600	<b>NNCF4926 V</b>
	180	50	1,5	255	540	750	1600	<b>NNCL4926 V</b>
	200	95	2	704	1380	700	1500	<b>NNCF5026 V</b>
<b>140</b>	190	50	1,5	265	576	700	1500	<b>NNC4928 V</b>
	190	50	1,5	265	576	700	1500	<b>NNCF4928 V</b>
	190	50	1,5	265	576	700	1500	<b>NNCL4928 V</b>
	210	95	2	737	1500	670	1400	<b>NNCF5028 V</b>
<b>150</b>	190	40	1,1	230	560	720	1500	<b>NNC4830 V</b>
	190	40	1,1	230	560	720	1500	<b>NNCF4830 V</b>
	190	40	1,1	230	560	720	1500	<b>NNCL4830 V</b>
	210	60	2	383	843	680	1400	<b>NNC4930 V</b>
	210	60	2	383	843	680	1400	<b>NNCF4930 V</b>
	210	60	2	383	843	680	1400	<b>NNCL4930 V</b>
	225	100	2,1	842	1680	630	1300	<b>NNCF5030 V</b>
<b>160</b>	200	40	1,1	238	600	680	1400	<b>NNC4832 V</b>
	200	40	1,1	238	600	680	1400	<b>NNCF4832 V</b>
	200	40	1,1	238	600	680	1400	<b>NNCL4832 V</b>
	220	60	2	399	906	650	1300	<b>NNC4932 V</b>
	220	60	2	399	906	650	1300	<b>NNCF4932 V</b>
	220	60	2	399	906	650	1300	<b>NNCL4932 V</b>

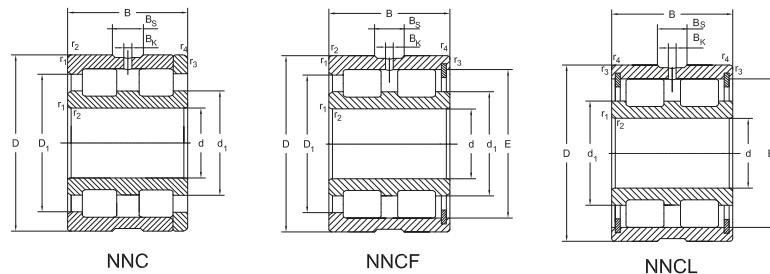
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

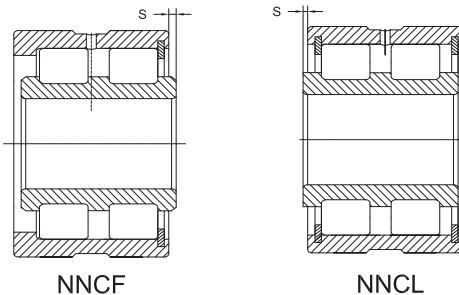
d	E	Dimensions					Mass Bearing
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$	
[kg]							
<b>130</b>	166	149,5	160,5	6	3,5	4	4,0
	166	149,5	160,5	6	3,5	4	4,0
	183,5	153	176	6	3,5	2,5	11,0
<b>140</b>	-	160	171	6	3,5	-	4,4
	176,4	160	171	6	3,5	4	4,2
	176,4	160	171	6	3,5	4	4,2
	195,5	165	188	7	4	3	11,5
<b>150</b>	-	165	174	7	4	-	3
	178,7	165	174	7	4	2	2,8
	178,7	165	-	7	4	2	2,8
	-	172,5	185,5	7	4	-	7
	192	172,5	185,5	7	4	4	6,8
	192	172,5	185,5	7	4	4	6,8
	209	175	201	7	4	3	14
<b>160</b>	-	176,5	185,5	7	4	-	3,2
	190,1	176,5	185,5	7	4	2	3,0
	190,1	176,5	-	7	4	2	3,0
	-	184,5	197,5	7	4	-	7,2
	203,9	184,5	197,5	7	4	4	7,1
	203,9	184,5	197,5	7	4	4	7,1

## Double Row Full Complement Cylindrical Roller Bearings



d mm	D mm	B mm	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
<b>160</b>	240	109	2,1	1010	1950	600	1200	<b>NNCF5032 V</b>
<b>170</b>	215	45	1,1	258	631	640	1300	<b>NNCF4834 V</b>
	215	45	1,1	258	631	640	1300	<b>NNCF4834 V</b>
	215	45	1,1	258	631	640	1300	<b>NNCL4834 V</b>
	230	60	2	408	950	600	1200	<b>NNC4934 V</b>
	230	60	2	408	950	600	1200	<b>NNCF4934 V</b>
	230	60	2	408	950	600	1200	<b>NNCL4934 V</b>
	260	122	2,1	1140	2170	560	1100	<b>NNCF5034 V</b>
<b>180</b>	225	45	1,1	266	664	610	1200	<b>NNC4836 V</b>
	225	45	1,1	266	664	610	1200	<b>NNCF4836 V</b>
	225	45	1,1	266	664	610	1200	<b>NNCL4836 V</b>
	250	69	2	547	1220	570	1100	<b>NNC4936 V</b>
	250	69	2	547	1220	570	1100	<b>NNCF4936 V</b>
	250	69	2	547	1220	570	1100	<b>NNCL4936 V</b>
	280	136	2,1	1320	2580	560	1100	<b>NNCF5036 V</b>
<b>190</b>	240	50	1,5	305	760	560	1150	<b>NNC4838 V</b>
	240	50	1,5	305	760	560	1150	<b>NNCF4838 V</b>
	240	50	1,5	305	760	560	1150	<b>NNCL4838 V</b>
	260	69	2	562	1290	550	1100	<b>NNC4938 V</b>
	260	69	2	562	1290	550	1100	<b>NNCF4938 V</b>

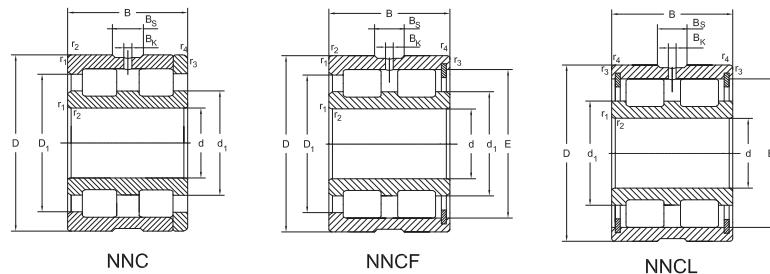
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

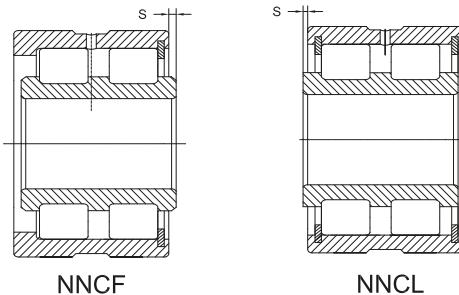
d	E	Dimensions					s ≈	Mass Bearing [kg]
		$d_1$ ≈	$D_1$ ≈	$B_s$ ≈	$B_k$			
<b>160</b>	225	185	215	7	4	3	17	
<b>170</b>	-	187,5	196,5	7	4	-	4,2	
	201,7	187,5	196,5	7	4	3	4,0	
	201,7	187,5	-	7	4	3	4,0	
	-	192,5	205,5	7	4	-	7,6	
	212,2	192,5	205,5	7	4	4	7,5	
	212,2	192,5	205,5	7	4	4	7,5	
	243	198	232	7	4	5	23,0	
<b>180</b>	-	196	207	7	4	-	4,5	
	211,3	196	207	7	4	3	4,2	
	211,3	196	-	7	4	3	4,2	
	-	207	223	7	4	-	11	
	231,1	207	223	7	4	4	10,8	
	231,1	207	223	7	4	4	10,8	
	260,5	212	249	8	4	6	30,5	
<b>190</b>	-	209	220	7	4	-	5,8	
	225,4	209	220	7	4	4	5,5	
	225,4	209	-	7	4	4	5,5	
	-	217,5	233	7	4	-	11,5	
	241,3	217,5	233	7	4	4	11,3	

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>190</b>	260	69	2	562	1290	550	1100	<b>NNCL4938 V</b>
	290	136	2,1	1380	2690	530	1000	<b>NNCF5038 V</b>
<b>200</b>	250	50	1,5	315	799	550	1100	<b>NNC4840 V</b>
	250	50	1,5	315	799	550	1100	<b>NNCF4840 V</b>
	250	50	1,5	315	799	550	1100	<b>NNCL4840 V</b>
	280	80	2,1	661	1495	530	1000	<b>NNC4940 V</b>
	280	80	2,1	661	1495	530	1000	<b>NNCF4940 V</b>
	280	80	2,1	661	1495	530	1000	<b>NNCL4940 V</b>
	310	150	2,1	1570	3130	500	950	<b>NNCF5040 V</b>
<b>220</b>	270	50	1,5	330	878	500	1000	<b>NNC4844 V</b>
	270	50	1,5	330	878	500	1000	<b>NNCF4844 V</b>
	270	50	1,5	330	878	500	1000	<b>NNCL4844 V</b>
	300	80	2,1	690	1610	500	950	<b>NNC4944 V</b>
	300	80	2,1	690	1610	500	950	<b>NNCF4944 V</b>
	300	80	2,1	690	1610	500	950	<b>NNCL4944 V</b>
	340	160	3	1870	3680	450	850	<b>NNCF5044 V</b>
<b>240</b>	300	60	2	497	1292	480	900	<b>NNC4848 V</b>
	300	60	2	497	1292	480	900	<b>NNCF4848 V</b>
	300	60	2	497	1292	480	900	<b>NNCL4848 V</b>
	320	80	2,1	725	1762	450	850	<b>NNC4948 V</b>

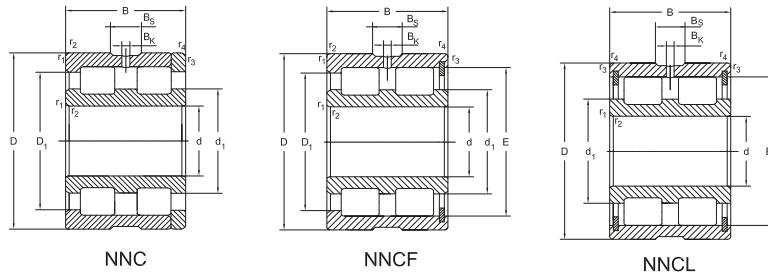
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

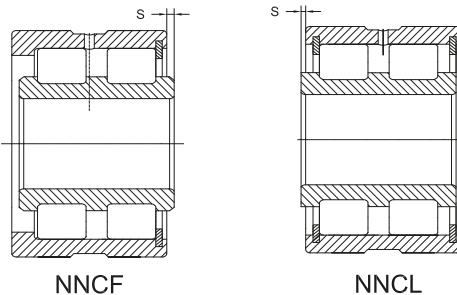
d	E	$d_1 \approx$	$D_1 \approx$	Dimensions			s $\approx$	Mass Bearing [kg]
				$B_s \approx$	$B_k$	s		
<b>190</b>	241,3	217,5	233	7	4	4	11,3	31,5
	270	222	258	8	4	6		
<b>200</b>	-	219,5	230	7	4	-	6	
	235,9	219,5	230	7	4	4	5,8	
	235,9	219,5	-	7	4	4	5,8	
	-	233	251	8	4	-	16	
	260	233	251	8	4	5	15,9	
	260	233	251	8	4	5	15,9	
	288	236	276	8	4	7	41,0	
<b>220</b>	-	240,5	251,5	7	4	-	6,5	
	256,9	240,5	251,5	7	4	4	6,3	
	256,9	240,5	-	7	4	4	6,3	
	-	250	268	8	4	-	17,5	
	277,2	250	268	8	4	5	17,2	
	277,2	250	268	8	4	5	17,2	
	315,5	255	300	8	4	7	52,5	
<b>240</b>	-	261,5	275,5	8	4	-	10,3	
	282,4	261,5	275,5	8	4	4	10,0	
	282,4	261,5	-	8	4	4	10,0	
	-	273	291	8	4	-	18,7	

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>240</b>	320	80	2,1	725	1762	450	850	<b>NNCF4948 V</b>
	320	80	2,1	725	1762	450	850	<b>NNCL4948 V</b>
	360	160	3	1980	4050	450	800	<b>NNCF5048 V</b>
<b>260</b>	320	60	2	521	1406	430	820	<b>NNC4852 V</b>
	320	60	2	521	1406	430	820	<b>NNCF4852 V</b>
	320	60	2	521	1406	430	820	<b>NNCL4852 V</b>
	360	100	2,1	1070	2520	400	750	<b>NNC4952 V</b>
	360	100	2,1	1070	2520	400	750	<b>NNCF4952 V</b>
	360	100	2,1	1070	2520	400	750	<b>NNCL4952 V</b>
	400	190	4	2640	5340	380	700	<b>NNCF5052 V</b>
<b>280</b>	350	69	2	680	1853	400	750	<b>NNC4856 V</b>
	350	69	2	680	1853	400	750	<b>NNCF4856 V</b>
	350	69	2	680	1853	400	750	<b>NNCL4856 V</b>
	380	100	2,1	1120	2710	380	700	<b>NNC4956 V</b>
	380	100	2,1	1120	2710	380	700	<b>NNCF4956 V</b>
	380	100	2,1	1120	2710	380	700	<b>NNCL4956 V</b>
	420	190	4	2700	5610	360	670	<b>NNCF5056 V</b>
<b>300</b>	380	80	2,1	801	2146	380	700	<b>NNC4860 V</b>
	380	80	2,1	801	2146	380	700	<b>NNCF4860 V</b>
	380	80	2,1	801	2146	380	700	<b>NNCL4860 V</b>

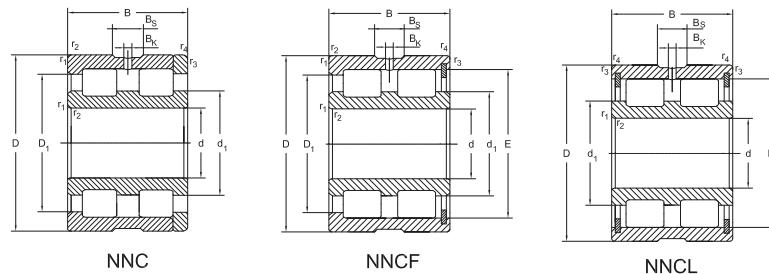
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

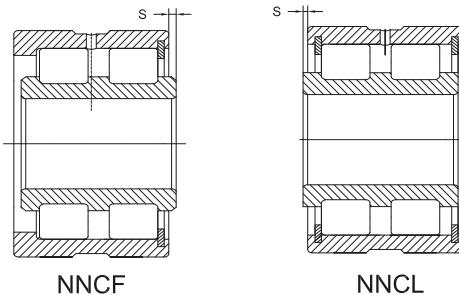
d	E	Dimensions					Mass Bearing
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$	
[kg]							
<b>240</b>	300,1	273	291	8	4	5	18,5
	300,1	273	291	8	4	5	18,5
	335,6	278	322	9,4	5	7	56,0
<b>260</b>	-	283,5	297,5	8	4	-	11,1
	304,7	283,5	297,5	8	4	4	10,8
	304,7	283,5	-	8	4	4	10,8
	-	297	320	9,4	5	-	33,1
	331,5	297	320	9,4	5	6	32,2
	331,5	297	320	9,4	5	6	32,2
	373,5	304	357	9,4	5	7	85,5
<b>280</b>	-	309	325	8	4	-	16,1
	332,9	309	325	8	4	4	15,8
	332,9	309	-	8	4	4	15,8
	-	319	342	9,4	5	-	34,5
	353,5	319	342	9,4	5	6	34,2
	353,5	319	342	9,4	5	6	34,2
	389	320	372	9,4	5	7	90,5
<b>300</b>	-	330,5	348,5	9,4	5	-	22,9
	357,4	330,5	348,5	9,4	5	6	22,5
	357,4	330,5	-	9,4	5	6	22,5

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>300</b>	420	118	3	1560	3630	340	650	<b>NNC4960 V</b>
	420	118	3	1560	3630	340	650	<b>NNCF4960 V</b>
	420	118	3	1560	3630	340	650	<b>NNCL4960 V</b>
	460	218	4	3410	7180	320	600	<b>NNCF5060 V</b>
<b>320</b>	400	80	2,1	832	2300	340	640	<b>NNC4864 V</b>
	400	80	2,1	832	2300	340	640	<b>NNCF4864 V</b>
	400	80	2,1	832	2300	340	640	<b>NNCL4864 V</b>
	440	118	3	1600	3835	320	600	<b>NNC4964 V</b>
	440	118	3	1600	3835	320	600	<b>NNCF4964 V</b>
	440	118	3	1600	3835	320	600	<b>NNCL4964 V</b>
	480	218	4	3470	7450	300	560	<b>NNCF5064 V</b>
<b>340</b>	420	80	2,1	850	2415	320	600	<b>NNC4868 V</b>
	420	80	2,1	850	2415	320	600	<b>NNCF4868 V</b>
	420	80	2,1	850	2415	320	600	<b>NNCL4868 V</b>
	460	118	3	1640	4035	300	560	<b>NNC4968 V</b>
	460	118	3	1640	4035	300	560	<b>NNCF4968 V</b>
	460	118	3	1640	4035	300	560	<b>NNCL4968 V</b>
	520	243	5	4180	9200	280	530	<b>NNCF5068 V</b>
<b>360</b>	440	80	2,1	880	2570	300	560	<b>NNC4872 V</b>
	440	80	2,1	880	2570	300	560	<b>NNCF4872 V</b>

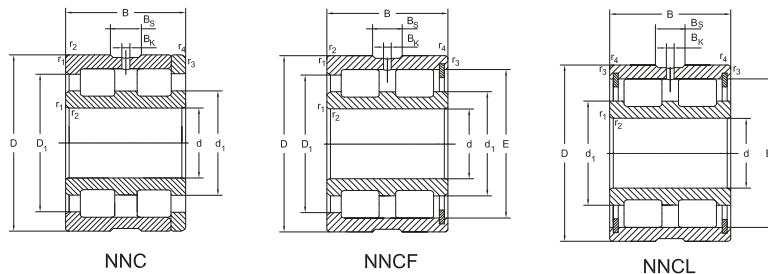
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

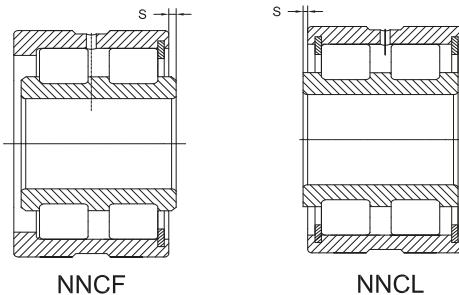
d	E	Dimensions					Mass Bearing
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$	
[kg]							
<b>300</b>	-	346,5	375,5	9,4	5	-	53
	390,2	346,5	375,5	9,4	5	6	52,8
	390,2	346,5	375,5	9,4	5	6	52,8
	432	355	413	9,4	5	9	130
<b>320</b>	-	353,5	371,5	9,4	5	-	24
	380,3	353,5	371,5	9,4	5	6	23,8
	380,3	353,5	-	9,4	5	6	23,8
	-	353,5	399	9,4	5	-	56
	409	353,5	399	9,4	5	6	55,2
	409	353,5	399	9,4	5	6	55,2
	447,5	370	429	9,4	5	9	135
<b>340</b>	-	370,5	388,5	9,4	5	-	25,5
	397,4	370,5	388,5	9,4	5	6	25,2
	397,4	370,5	-	9,4	5	6	25,2
	-	383,5	412,5	9,4	5	-	60,5
	427,1	383,5	412,5	9,4	5	6	58,8
	427,1	383,5	412,5	9,4	5	6	58,8
	486	399	465	9,4	5	11	185
<b>360</b>	-	393	411	9,4	5	-	27
	420,2	393	411	9,4	5	6	26,5

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>360</b>	440	80	2,1	880	2570	300	560	<b>NNCL4872 V</b>
	480	118	2,5	1690	4240	300	550	<b>NNC4972 V</b>
	480	118	2,5	1690	4240	300	550	<b>NNCF4972 V</b>
	540	243	5	4290	9570	260	500	<b>NNCF5072 V</b>
<b>380</b>	480	100	2,1	1293	3618	280	530	<b>NNC4876 V</b>
	480	100	2,1	1293	3618	280	530	<b>NNCF4876 V</b>
	480	100	2,1	1293	3618	280	530	<b>NNCL4876 V</b>
	520	140	4	2124	5460	260	500	<b>NNC4976 V</b>
	520	140	4	2124	5460	260	500	<b>NNCF4976 V</b>
	520	140	4	2124	5460	260	500	<b>NNCL4976 V</b>
	560	243	5	4400	9940	240	480	<b>NNCF5076 V</b>
<b>400</b>	500	100	2,1	1311	3748	270	500	<b>NNC4880 V</b>
	500	100	2,1	1311	3748	270	500	<b>NNCF4880 V</b>
	500	100	2,1	1311	3748	270	500	<b>NNCL4880 V</b>
	540	140	4	2185	5730	240	480	<b>NNC4980 V</b>
	540	140	4	2185	5730	240	480	<b>NNCF4980 V</b>
	540	140	4	2185	5730	240	480	<b>NNCL4980 V</b>
	600	272	5	5500	12300	220	450	<b>NNCF5080 V</b>
<b>420</b>	520	100	2,1	1353	3942	250	470	<b>NNC4884 V</b>

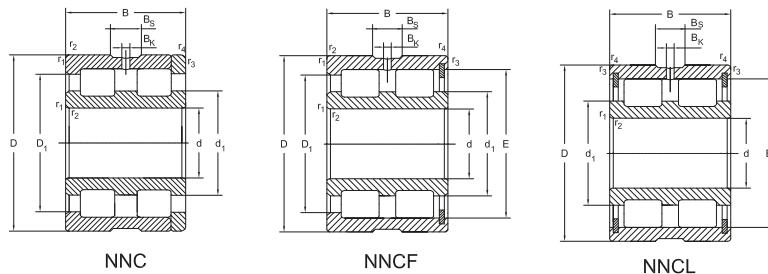
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

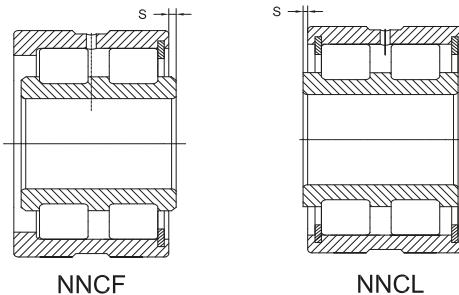
d	E	Dimensions					s ≈	Mass Bearing
		$d_1$ ≈	$D_1$ ≈	$B_s$ ≈	$B_k$	[kg]		
<b>360</b>	420,2	393	-	9,4	5	6	26,5	
	-	399	436,5	9,4	5	-	61	
	446	399	436,5	9,4	5	6	60,5	
	504	417	483	9,4	5	11	195	
<b>380</b>	-	421,5	444,5	9,4	5	-	45	
	456,0	421,5	444,5	9,4	5	6	44,6	
	456,0	421,5	-	9,4	5	6	44,6	
	-	433,5	465,5	9,4	5	-	93	
	481,5	433,5	465,5	9,4	5	7	92,4	
	481,5	433,5	465,5	9,4	5	7	92,4	
	532	435	511	9,4	5	11	200	
<b>400</b>	-	436	459	9,4	5	-	47	
	470,3	436	459	9,4	5	6	46,8	
	470,3	436	-	9,4	5	6	46,8	
	-	454	486	9,4	5	-	97,5	
	502	454	486	9,4	5	7	96,5	
	502	454	486	9,4	5	7	96,5	
	560	464	536	9,4	5	11	270	
<b>420</b>	-	458	481	9,4	5	-	49,2	

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>420</b>	520	100	2,1	1353	3942	250	470	<b>NNCF4884 V</b>
	520	100	2,1	1353	3942	250	470	<b>NNCL4884 V</b>
	560	140	4	2235	6000	220	450	<b>NNC4984 V</b>
	560	140	4	2235	6000	220	450	<b>NNCF4984 V</b>
	560	140	4	2235	6000	220	450	<b>NNCL4984 V</b>
	620	272	5	5610	12800	200	430	<b>NNCF5084 V</b>
<b>440</b>	540	100	2,1	1387	4136	240	450	<b>NNC4888 V</b>
	540	100	2,1	1387	4136	240	450	<b>NNCF4888 V</b>
	540	100	2,1	1387	4136	240	450	<b>NNCL4888 V</b>
	600	160	4	2990	7570	200	430	<b>NNC4988 V</b>
	600	160	4	2990	7570	200	430	<b>NNCF4988 V</b>
	600	160	4	2990	7570	200	430	<b>NNCL4988 V</b>
	650	280	6	6160	14100	190	400	<b>NNCF5088 V</b>
<b>460</b>	580	118	3	1560	4614	230	420	<b>NNC4892 V</b>
	580	118	3	1560	4614	230	420	<b>NNCF4892 V</b>
	580	118	3	1560	4614	230	420	<b>NNCL4892 V</b>
	620	160	4	3020	7770	190	400	<b>NNC4992 V</b>
	620	160	4	3020	7770	190	400	<b>NNCF4992 V</b>
	620	160	4	3020	7770	190	400	<b>NNCL4992 V</b>
	680	130	6	6440	14700	180	380	<b>NNCF5092 V</b>

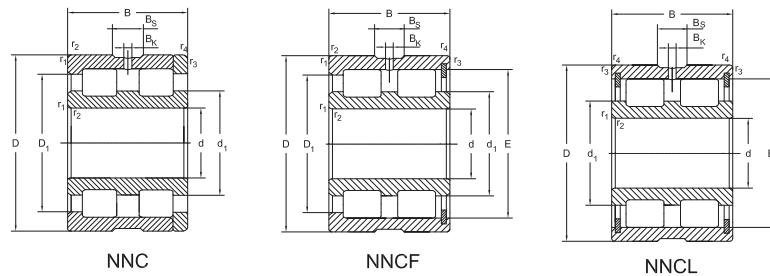
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

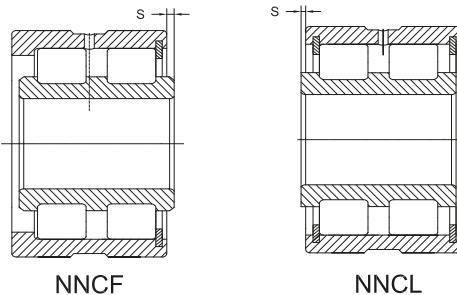
d	E	Dimensions						Mass Bearing
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$	[kg]	
<b>420</b>	492,5	458	481	9,4	5	6	48,8	
	492,5	458	-	9,4	5	6	48,8	
	-	470,5	512	9,4	5	-	100	
	522,5	470,5	512	9,4	5	7	99,0	
	522,5	470,5	512	9,4	5	7	99,0	
	579	483	555	9,4	5	11	280	
<b>440</b>	-	480	503	9,4	5	-	51,5	
	541,6	480	503	9,4	5	6	50,9	
	514,6	480	-	9,4	5	6	50,9	
	-	503,5	543,5	9,4	5	-	140	
	563,5	503,5	543,5	9,4	5	7	138	
	563,5	503,5	543,5	9,4	5	7	138	
	608	507	583	9,4	5	11	320	
<b>460</b>	-	506	531	9,4	5	-	77,5	
	543,3	506	531	9,4	5	7	76,9	
	543,3	506	-	9,4	5	7	76,9	
	-	512	564	9,4	5	-	145	
	577	512	564	9,4	5	7	141	
	577	512	564	9,4	5	7	141	
	638	527	609	9,4	5	14	365	

## Double Row Full Complement Cylindrical Roller Bearings



d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Basical radial load		Speed Ratings		Designation
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	n <sub>g</sub> grease	n <sub>g</sub> oil	
mm								
<b>480</b>	600	118	3	1597	4838	210	400	<b>NNC4896 V</b>
	600	118	3	1597	4838	210	400	<b>NNCF4896 V</b>
	600	118	3	1597	4838	210	400	<b>NNCL4896 V</b>
	650	170	5	3270	8420	180	360	<b>NNC4996 V</b>
	650	170	5	3270	8420	180	360	<b>NNCF4996 V</b>
	650	170	5	3270	8420	180	360	<b>NNCL4996 V</b>
	700	300	6	6710	15300	170	360	<b>NNCF5096 V</b>
<b>500</b>	620	118	3	1625	4987	200	380	<b>NNC48/500 V</b>
	620	118	3	1625	4987	200	380	<b>NNCF48/500 V</b>
	620	118	3	1625	4987	200	380	<b>NNCL48/500 V</b>
	670	170	5	3350	8850	170	360	<b>NNC49/500 V</b>
	670	170	5	3350	8850	170	360	<b>NNCF49/500 V</b>
	670	170	5	3350	8850	170	360	<b>NNCL49/500 V</b>
	720	300	6	6820	15900	170	360	<b>NNCF50/500 V</b>
<b>530</b>	650	118	3	5285	5285	180	340	<b>NNC48/530 V</b>
	650	118	3	2285	5285	180	340	<b>NNCF48/530 V</b>
	650	118	3	5285	5285	180	340	<b>NNCL48/530 V</b>
	710	180	4	10100	10100	160	340	<b>NNC49/530 V</b>
	710	180	4	10100	10100	160	340	<b>NNCF49/530 V</b>
	710	180	4	10100	10100	160	340	<b>NNCL49/530 V</b>

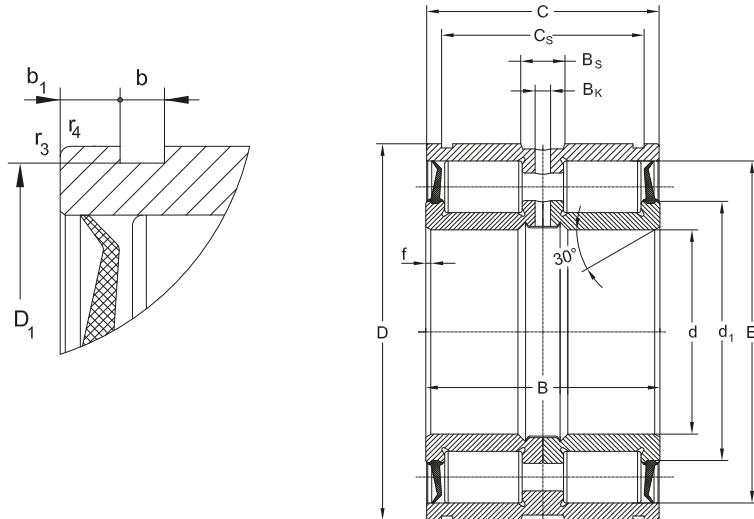
## Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet dimensions see on page 210*

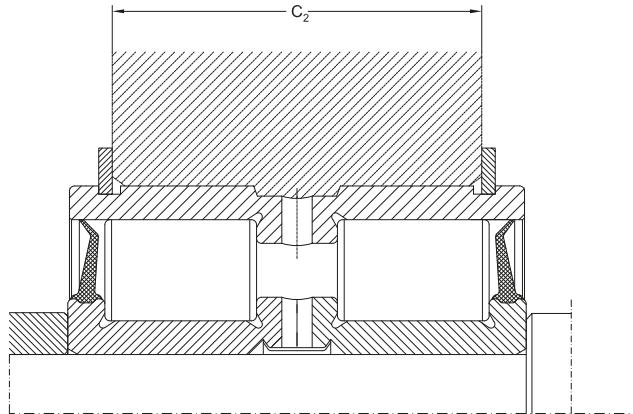
d	E	Dimensions						Mass Bearing
		$d_1 \approx$	$D_1 \approx$	$B_s \approx$	$B_k$	s $\approx$	[kg]	
<b>480</b>	-	530	555	9,4	5	-	80	
	567,3	530	555	9,4	5	7	89,8	
	567,3	530	-	9,4	5	7	89,8	
	-	537	592	9,4	5	-	170	
	605,5	537	592	9,4	5	8	166	
	605,5	537	592	9,4	5	8	166	
	657	548	630	9,4	5	14	380	
<b>500</b>	-	547	571	9,4	5	-	82,5	
	583,5	547	571	9,4	5	7	83,0	
	583,5	547	-	9,4	5	7	83,0	
	-	568,5	610,5	9,4	5	-	179	
	631,5	568,5	610,5	9,4	5	8	175	
	631,5	568,5	610,5	9,4	5	8	175	
	678	569	651	9,4	5	14	390	
<b>530</b>	-	577,5	602,5	9,4	5	-	87,5	
	615	577,5	602,5	9,4	5	6	87,2	
	615	577,5	-	9,4	5	6	87,2	
	-	588	648	9,4	5	-	208	
	663	588	648	9,4	5	8	205	
	663	588	648	9,4	5	8	205	

## Sealed Double Row Full Complement Cylindrical Roller Bearings



d	D	Dimensions			$r_3, r_4$ min.	Basical radial load		Speed Ratings	Designation
		B	C	$C_s$		dyn. $C_r$	stat. $C_{0r}$		
mm							kN	[min <sup>-1</sup> ]	
<b>25</b>	47	30	29	24,7	0,3	44,5	65,3	3000	<b>NNF5005 2LSV</b>
<b>30</b>	55	34	33	28,2	0,3	48,5	70	2600	<b>NNF5006 2LSV</b>
<b>35</b>	62	36	35	30,2	0,3	66	95,8	2200	<b>NNF5007 2LSV</b>
<b>40</b>	68	38	37	32,2	0,6	79	121	2000	<b>NNF5008 2LSV</b>
<b>45</b>	75	40	39	34,2	0,6	95,1	150	1800	<b>NNF5009 2LSV</b>
<b>50</b>	80	40	39	34,2	0,6	101	162	1700	<b>NNF5010 2LSV</b>
<b>55</b>	90	46	45	40,2	0,6	119	195	1500	<b>NNF5011 2LSV</b>
<b>60</b>	95	46	45	40,2	0,6	123	210	1400	<b>NNF5012 2LSV</b>
<b>65</b>	100	46	45	40,2	0,6	128	224	1300	<b>NNF5013 2LSV</b>
<b>70</b>	110	54	53	48,2	0,6	190	337	1200	<b>NNF5014 2LSV</b>
<b>80</b>	125	60	59	54,2	0,6	233	420	1000	<b>NNF5016 2LSV</b>
<b>90</b>	140	67	66	59,2	0,6	297	552	900	<b>NNF5018 2LSV</b>
<b>100</b>	150	67	66	59,2	0,6	314	580	850	<b>NNF5020 2LSV</b>
<b>110</b>	170	80	79	70,2	0,6	380	699	750	<b>NNF5022 2LSV</b>

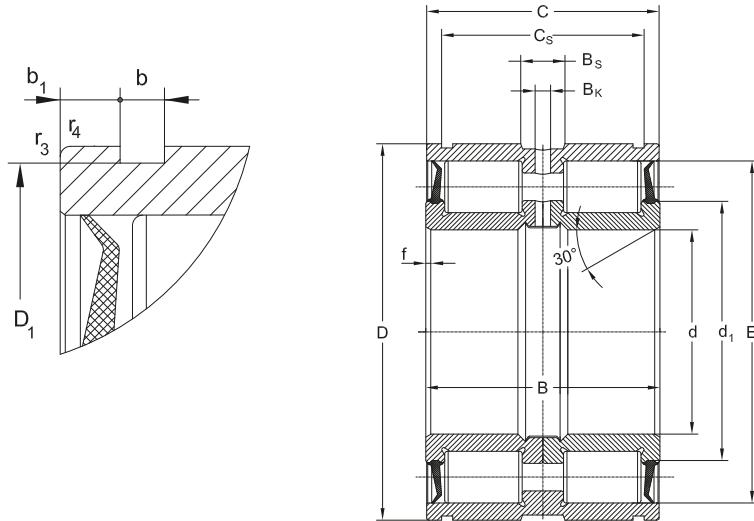
## Sealed Double Row Full Complement Cylindrical Roller Bearings



*Abutment and fillet  
dimensions see on  
page 210*

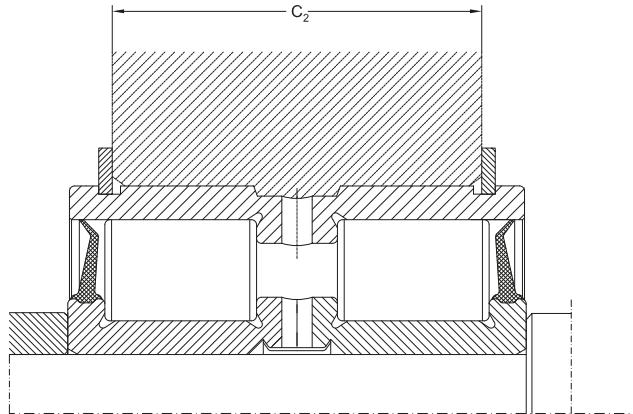
d	$d_1 \approx$	$D_1 \approx$	Dimensions								Adequate snap ring according to <b>DIN 471</b>	Mass Bearing [kg]
			E	b	$b_1$	$B_s \approx$	$B_k$	f	$C_2 \pm 0,1$			
<b>25</b>	33	44,8	40,4	1,8	2,15	4,5	3	0,5	21	47x1,75	0,23	
<b>30</b>	39	52,8	47,9	2,1	2,4	4,5	3	0,5	24	55x2	0,35	
<b>35</b>	45	59,8	54,5	2,1	2,4	4,5	3	0,5	26	62x2	0,45	
<b>40</b>	50,5	65,8	61	2,7	2,4	4,5	3	0,8	27	68x2,5	0,53	
<b>45</b>	56,4	72,8	67,7	2,7	2,4	4,5	3	0,8	29	75x2,5	0,68	
<b>50</b>	61,2	77,8	72,5	2,7	2,4	4,5	3	0,8	29	80x2,5	0,73	
<b>55</b>	68	87,4	80	3,2	2,4	4,5	3,5	1	34	90x3	1,10	
<b>60</b>	73	92,5	85	3,2	2,4	4,5	3,5	1	34	95x3	1,20	
<b>65</b>	78	97,4	90	3,2	2,4	4,5	3,5	1	34	100x3	1,30	
<b>70</b>	85	107,1	100	4,2	2,4	5	3,5	1	40	110x4	1,85	
<b>80</b>	97	122,1	113,5	4,2	2,4	5	3,5	1,5	46	125x4	2,70	
<b>90</b>	109	137	127,5	4,2	3,4	5	3,5	1,5	51	140x4	3,80	
<b>100</b>	118	147	138	4,2	3,4	6	3,5	1,5	51	150x4	4,05	
<b>110</b>	132	167	154,5	4,2	4,4	6	3,5	1,8	62	170x4	6,45	

## Sealed Double Row Full Complement Cylindrical Roller Bearings



d	D	B	C	Cs	r <sub>3</sub> , r <sub>4</sub> min.	Basical radial load		Speed Ratings	Designation
						dyn. C <sub>r</sub>	stat. C <sub>0r</sub>		
mm								kN	[min <sup>-1</sup> ]
120	180	80	79	71,2	0,6	402	745	700	NNF5024 2LSV
130	200	95	94	83,2	0,6	572	1050	630	NNF5026 2LSV
140	210	95	94	83,2	0,6	594	1140	600	NNF5028 2LSV
150	225	100	99	87,2	0,6	693	1310	560	NNF5030 2LSV
160	240	109	108	95,2	0,6	721	1410	500	NNF5032 2LSV
170	260	122	121	107,2	0,6	935	1800	480	NNF5034 2LSV
180	280	136	135	118,2	0,6	1080	2130	450	NNF5036 2LSV
190	290	136	135	118,2	0,6	1100	2210	430	NNF5038 2LSV
200	310	150	149	128,2	0,6	1340	2870	400	NNF5040 2LSV
220	340	160	159	138,2	1	1510	3130	360	NNF5044 2LSV
240	360	160	159	138,2	1	1570	3310	340	NNF5048 2LSV

## Sealed Double Row Full Complement Cylindrical Roller Bearings

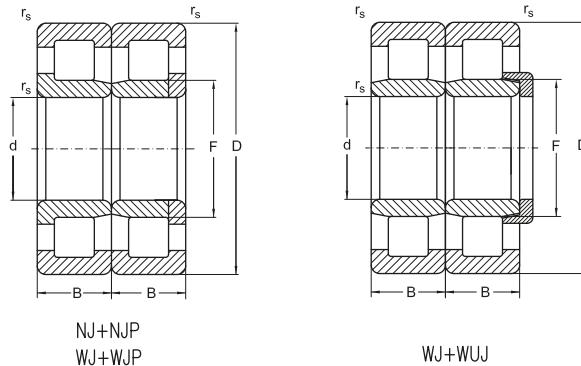


*Abutment and fillet dimensions see on page 210*

d	$d_1 \approx$	$D_1 \approx$	Dimensions								Adequate snap ring according to DIN 471	Mass Bearing [kg]
			E	b	$b_1$	$B_s \approx$	$B_k$	f	$C_2 \pm 0,1$			
<b>120</b>	141	176	164	4,2	3,9	6	3,5	1,8	63	180x4	6,90	
<b>130</b>	155	196	183,5	4,2	5,4	7	4	1,8	75	200x4	10,5	
<b>140</b>	167	206	195,5	5,2	5,4	7	4	1,8	73	210x5	11	
<b>150</b>	177	221	209,2	5,2	5,9	7	4	2	77	225x5	13,5	
<b>160</b>	191	236	222,6	5,2	6,4	7	4	2	85	240x5	16,5	
<b>170</b>	203	254	239	5,2	6,9	7	4	2	97	260x5	22,5	
<b>180</b>	220	274	259	5,2	8,4	8	4	2	108	280x5	30	
<b>190</b>	228	284	267,3	5,2	8,4	8	4	2	108	290x5	31,5	
<b>200</b>	245	304	284	6,3	10,4	8	4	2	116	310x6	42	
<b>220</b>	264	334	308,5	6,3	10,4	8	6	2	126	340x6	53,5	
<b>240</b>	283	354	327,5	6,3	10,4	9,4	6	2	126	360x6	57,5	

## Cylindrical roller bearings, double row and three row

Non-standardized



NJ+NJP  
WJ+WJP

WJ+WUJ

d	D	B	$r_s$	Dimensions		dyn. $C_r$	stat. $C_{0r}$	Speed limit	Mass	Designation
mm										
<b>85</b>	170	60	3	105	578	862	2800	14,5		<b>NJ+NJP85/170 MAP63</b>
<b>110</b>	215	73	3	135,5	773	1188	2600	25,0		<b>WJ+WJP110/215 M</b>
	215	73	3	135,5	773	1188	2600	26,0		<b>WJ+WUJ110/215 M</b>
<b>120</b>	240	80	3	150	946	1484	2400	34,7		<b>WJ+WJP120/240 M</b>
	240	80	3	150	946	1484	2400	34,7		<b>WJ+WUJ120/240 M</b>
<b>130</b>	240	80	3	157	951	1620	2200	35,6		<b>WJ+WJP130/240 M</b>
	250	80	3	160	1028	1660	2200	37,5		<b>WJ+WJP130/250 F</b>
	250	80	3	160	1028	1660	2200	37,7		<b>WJ+WJP130/250 M</b>
	250	80	3	158	1028	1660	2200	37,8		<b>WJ+WJP130/250 MPA</b>
	260	86	3	164	1212	1932	2000	44,4		<b>WJ+WJP130/260 M</b>
<b>140</b>	300	102	4	180	1554	2460	1800	71,6		<b>WJ+WJP140/300 M</b>
	300	102	4	180	1554	2460	1800	71,6		<b>WJ+WUJ140/300 M</b>
<b>160</b>	320	102	4	200	1630	2676	1500	81,6		<b>WJ+WJP160/320 FC4</b>

## Cylindrical roller bearings, single row

Non-standardized

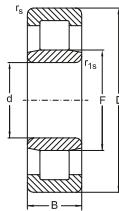


fig. 1

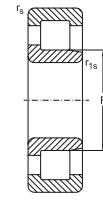


fig. 2

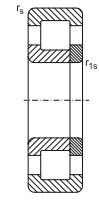


fig. 3

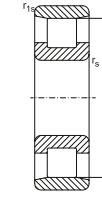


fig. 4

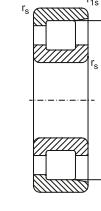


fig. 5

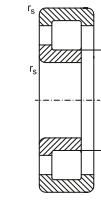


fig. 6

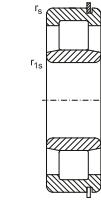
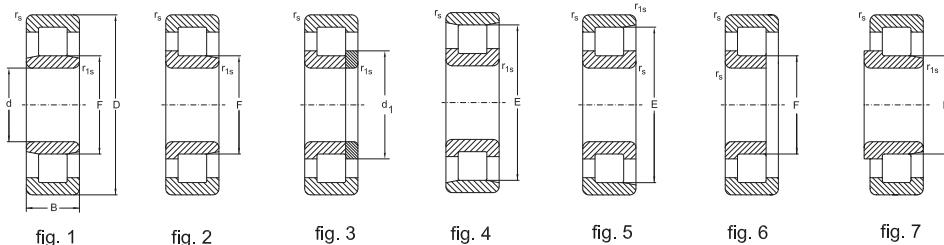


fig. 7

d	D	B	Dimensions			Fig.	Basical radial load		Speed limit	Mass	Designation
			$r_s$	$r_{1s}$	E, F min		dyn.	stat.			
mm											
							kN				
<b>20</b>	47	14	1	0,6	40	5	15,2	12,5	15000	18000	0,110
	52	15	1,1	0,6	44,5	5	21,1	17,1	12000	15000	0,152
<b>25</b>	62	17	1,1	1,1	34	2	41,2	37	10000	13000	0,243
<b>30</b>	67	16	0,6	1	38,5	3	23,4	21,5	10000	12500	0,296
	67	16	0,6	1	38,5	3	23,4	21,5	10000	12500	0,296
	72	19	1,1	1,1	62	4	38,7	35,2	8500	10000	0,346
<b>32</b>	72	19	1,5	1,1	62	4	38,3	34,8	8000	9500	0,346
	72	19	1,5	1,5	61,8	5	55,5	56,8	8000	9500	0,370
<b>35</b>	80	21	1,5	1,1	68,2	5	47,3	44,1	7700	8700	0,485
<b>40</b>	80	18	1,1	1,1	70	5	43,7	42,9	8000	9500	0,380
	90	23	1,5	1,5	77,5	5	56,2	53,8	7000	8500	0,660
<b>45</b>	85	19	1,1	1,1	75	5	46	46,9	7500	9000	0,445
	100	25	1,5	1,5	86,5	5	72	70	6000	7000	0,895
	100	25	1,5	1,5	58,5	6	72	70	6000	7000	0,870
	100	25	1,5	1,5	58,5	6	96,9	97,7	6000	7000	0,895
	100	25	1,5	1,5	58,5	13	96,9	97,7	6000	7000	0,895
	100	36	2	1,5	86,5	5	103	110	6000	7000	1,29
<b>50</b>	90	20	1,1	1,1	80,4	5	48,2	51	6700	8000	0,490
	90	20	1,1	1,1	80,4	5	48,2	51	6700	8000	0,490
	90	20	1,1	1,1	59,5	6	63,7	68,3	6700	8000	0,490
	90	23	0,5	0,5	57,8	3	91,1	98,4	2500	3200	0,632
	110	44,5	2	2	62	3	124	163	5300	6300	2,28
	110	27	2	2	95	5	86,9	86,2	8500	6500	1,14
<b>55</b>	100	21	1,5	1,1	88,5	5	57,9	62,5	6300	7500	0,665
	100	21	1,5	1,1	88,5	5	57,9	62,5	6300	7500	0,665
	110	22	2,5	2,5	72	2	93,4	102	5000	6000	0,922
	120	29	2	2	70,5	6	109	109	5000	6000	1,47
	120	29	2	2	70,5	13	138	150	4500	5600	1,52
	120	29	2	2	104,5	5	109	109	5000	6000	1,47
	120	29	2	2	104,5	5	109	109	5000	6000	1,65
<b>57,15</b>	114,30	28	1,5	1,5	99,6	5	84,5	88,7	5000	6000	1,45
NF5211 MB											

## Cylindrical roller bearings, single row

Non-standardized



Dimensions					Fig. Basical radial load		Speed limit	Mass	Designation
d	D	B	r <sub>s</sub>	r <sub>1s</sub>	E, F	dyn. min	C <sub>r</sub>	C <sub>0r</sub>	Grease Oil
mm					kN				
<b>60</b>	110	22	1,5	1,5	100	2	93,4	101	5600 6700 0,825 <b>NJ212 E/X</b>
<b>65</b>	120	23	1,5	1,5	105,6	5	80,5	89,7	5300 6300 1,05 <b>NF213</b>
<b>70</b>	125	24	1,5	1,5	83,5	3	118	136	5000 6000 1,17 <b>NUP2214 EW7</b>
	150	35	2,1	2,1	89	13	203	220	4000 4800 2,80 <b>NUPJ314 EN</b>
	150	35	2,1	2,1	89	13	203	220	4000 4800 2,80 <b>NUPJ314 ENMA</b>
	150	35	2,1	2,1	89	13	203	220	4000 4800 2,80 <b>NUPJ314 ENMAs</b>
	150	35	2,1	2,1	89	6	203	220	4000 4800 2,73 <b>NUPJ314 EMA</b>
	240	80	3	3	143	7	664	863	3200 4000 22,94 <b>CR0136.14</b>
<b>75</b>	130	25	1,5	1,5	116,5	5	92,5	106	4800 5600 1,28 <b>NF215</b>
<b>80</b>	140	26	2	2	125,3	5	106	122	4300 5000 1,54 <b>NF216</b>
	140	26	2	2	125,3	8	106	122	4300 5000 1,54 <b>NP216</b>
	140	26	2	2	127,3	8	139	166	4300 5000 1,54 <b>NP216 EM</b>
	140	26	2	2	127,3	6	139	166	4300 5000 1,51 <b>NUPJ216 E</b>
<b>90</b>	160	30	2	2	143	5	149	174	3800 4500 2,36 <b>NF218</b>
	190	43	3	3	165	5	237	261	3200 3800 5,42 <b>NF318</b>
	190	43	2,1	2,1	115	6	237	261	3200 3800 5,38 <b>NUPJ318 M</b>

## Cylindrical roller bearings, single row

Non-standardized

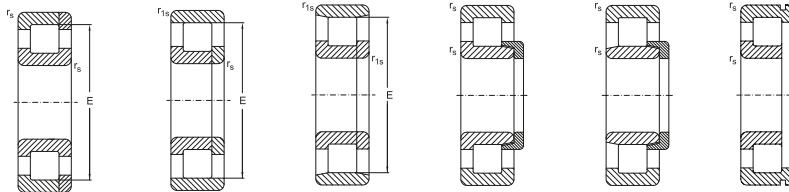


fig. 8

fig. 9

fig. 10

fig. 11

fig. 12

fig. 13

Dimensions						Fig.	Basical radial load		Speed limit	Mass	Designation	
d	D	B	r <sub>s</sub>	r <sub>is</sub>	E, F min		dyn.	stat.				
mm						kN						
<b>95,25</b>	133,35	19,05	1,5	1,1	123	4	60,9	83,7	3600	4300	0,85	<b>N5319 MBP5</b>
<b>99,5</b>	180	46	2,1	2,1	120	2	270	360	3000	3600	5,32	<b>NJ2220 MF2</b>
<b>100</b>	215	47	3	3	185,5	9	309	354	3000	3600	8,525	<b>NP320 M</b>
	215	73	3	3	127,5	1	570	717	2600	3200	12,0	<b>NU2320 EMW33</b>
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	<b>NU2320 MAW33</b>
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	<b>NU2320 MW33</b>
	215	73	3	3	129,5	1	457	584	2600	3200	12,0	<b>NU2320 W33</b>
	215	73	3	3	127,5	12	568	714	2600	3200	12,0	<b>NUJ2320 EM</b>
	215	47	3	3	185,5	10	308	352	2800	2400	8,67	<b>NT5220 MNA</b>
	215	47	4	4	127	11	384	432	3100	3900	10,530	<b>MR320-129</b>
<b>112</b>	170	38	2	1	127	1	181	264	3000	3600	3,15	<b>NU5120</b>
<b>130</b>	165	22	1	1	155,55	6	78,1	146	3300	4100	1,21	<b>N5126 MB</b>
	165	22	2	1	155,5	6	78,1	146	3300	4100	1,2	<b>2002826 LM</b>
	200	33	2	1	148	1	163	221	3000	3600	3,91	<b>NU1026 M</b>

## Cylindrical roller bearings, single row

Non-standardized

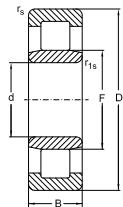


fig. 1



fig. 2

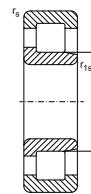


fig. 3



fig. 4

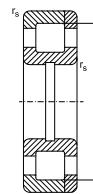


fig. 5

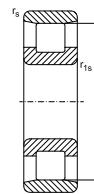


fig. 6

d m	D m	B m	Dimensions		Fig.	Basical radial load dyn. $C_r$	Speed limit stat. $C_{or}$	Mass Grease Oil	Designation
			$r_s$ m	$r_{1s}$ m					
<b>150</b>	225	45	2,1	1,5	168,5	1	338	527	2200 2600 6,49 <b>NU2030 EMC3ZS</b>
<b>160</b>	240	25	1,5	1,5	216	6	169	259	2200 2600 4,31 <b>NG160 M</b>
<b>165,1</b>	279,4	39,687	2	1,5	188,1	3	424	516	2200 2800 10,9 <b>65RIT292</b>
<b>180</b>	280	31	1,5	1,5	250,1	6	258	401	1800 2200 7,71 <b>NG180M</b>
	320	52	4	4	282	8	516	717	1800 2200 18,8 <b>NF236 M</b>
<b>190</b>	290	60	2,1	2,1	214	1	616	561	1700 2000 14,8 <b>NU2038 EMC3ZS</b>
<b>220</b>	340	56	3	3	250	3	650	1047	1300 1600 19,3 <b>NJ1044 B/M/R204</b>
	400	65	4	4	270	16	778	1113	1400 1700 41,6 <b>NUJ244 M</b>
<b>240</b>	319,975	48	2	1,5	300	6	405	736	1500 1800 10,7 <b>N5248 MBP5NA</b>
	320	48	2	2	261	1	361	684	1500 1800 11,2 <b>NU2948 MAP63</b>
<b>285,75</b>	387,35	69,85	2,5	2,5	368	6	748	1533	1500 1700 24,7 <b>491457 M</b>
<b>300</b>	380	48	1,5	2,1	321	2	479	988	1400 1600 14,3 <b>NJ2860 EMA</b>
<b>305</b>	460	65	5	5	422	7	884	1418	1400 1700 38,775 <b>N10/305 NA</b>
<b>381</b>	508	63,5	4	4	406,5	3	951	1688	900 1100 37,0 <b>NJ5176 MW33</b>

## Cylindrical roller bearings, single row

Non-standardized

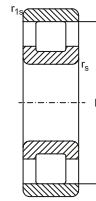


fig. 7

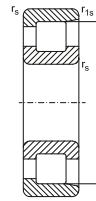


fig. 8

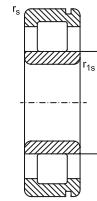


fig. 9

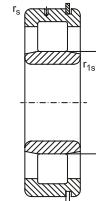


fig. 10

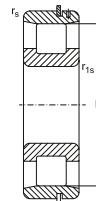


fig. 11



fig. 12

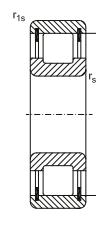


fig. 13

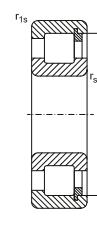


fig. 14

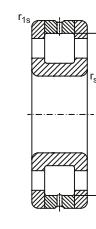


fig. 15

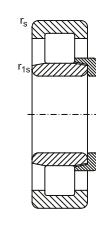
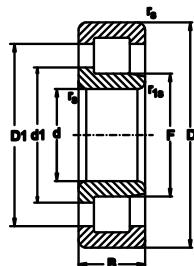


fig. 16

d	D	B	Dimensions			Fig.	Basical radial load dyn. $C_r$	Speed limit	Mass	Designation
			$r_s$	$r_{1s}$	E, F min					
mm										
							kN			
<b>25</b>	62	17	1,1	1,1	53	13	39,3	37,5	3800	N2R305 V
	67	15	0,6	0,6	31,5	10	29,3	27,7	10400	NU5305 ENR
	67	15	1	0,6	53,5	11	23,4	21,5	10400	N5805 NR
	67	15	1	0,6	53,5	11	23,4	21,5	10400	N5805 NRC3NA
<b>30</b>	62	24	1	1	54	13	44,2	47	8000	N2R5706
	67	16	1	0,6	53,5	11	23,4	21,5	10000	N5806 NRP6
	67	15	1	0,6	53,5	11	23,4	21,5	10000	N5806 NRP6F2
	67	16	1	0,6	53,5	11	23,4	21,5	10000	N5806 NRP6NA
	80	21	1	1	67,8	13	73,9	84,5	3000	N2R5206 V
	62	19	1	1	54,5	13	51,4	57,7	3700	N2R5906 V
<b>32</b>	72	19	2	1,5	61,8	12	55,5	56,8	8000	NF5306 NV
<b>34,991</b>	72	20,638	1,6	4	62,471	14	67,6	77,6	7000	8500
									0,40	482307 V
<b>35</b>	72	23	0,6	1,6	64,7	13	68,7	75,7	7000	N2R2207 V
	72	27	1	1	62,5	13	63,7	72,5	7000	N2R5207
	80	23	1,5	0,6	49,5	9	58	61	6300	NUC5107 NM
<b>40</b>	80	18	1,4	1	71,5	13	61	62,6	2800	N2R5108 V
	90	23	1	1	78	13	71,8	70,3	5600	N2R308
	90	23	1,6	1,6	77,663	13	72	71,4	5600	482208
<b>45</b>	85	19	1	1	74,2	13	59,7	66,1	2600	N2R209 V
	85	23	1,1	1,1	74,2	13	80	96,5	2400	N2R2209 V
	100	25	1,6	1,6	88,25	13	110	111	2200	N2R309 V
<b>50</b>	80	15	1	1	72,5	13	41,5	51,2	2800	N2R5510 V
<b>55</b>	140	57	2	2	117,2	15	175	392	1400	2000
									4,80	N2P5611 MBW33
<b>65</b>	140	33	3	1,5	121,3	13	152	163	3000	N2R5613 VC4
	140	33	3	1,5	121,3	14	197	231	1400	NFR5113 VC4
<b>70</b>	150	35	2,1	2,1	129,3	13	173	188	3400	N2R314

## Cylindrical roller bearings, single row

Non-standardized



**NJ.....V,VH**

d	D	B	$r_s$	$r_{ls}$ min	Basical radial load dyn.		Speed limit	Designation
					$C_r$	$C_{0r}$		
mm								
					kN			
<b>100</b>	180	60,3	2,1	2,1	414	631	1200	<b>NJ5220 VC3</b>
	180	60,3	2,1	2,1	414	631	1200	<b>NJ5220 VH</b>
	215	73	3		655	830	800	<b>NJ2320 VH</b>
	125	13	1	0,6	33,6	55,3	4400	<b>NJ1820 VH</b>
<b>110</b>	240	80	3		830	1060	700	<b>NJ2322 VH</b>
<b>120</b>	260	86	3		950	1220	630	<b>NJ2324 VH</b>
<b>130</b>	230	64	3	3	591	853	600	<b>NJ130X230X64 V</b>
	280	93	4		1100	1430	560	<b>NJ2326 VH</b>
<b>140</b>	300	102	4		1250	1630	530	<b>NJ2328 VH</b>
<b>150</b>	320	108	4		1500	2000	500	<b>NJ2330 VH</b>
<b>160</b>	340	114	4		1630	2200	450	<b>NJ2332 VH</b>
<b>170</b>	360	120	4		1760	2400	450	<b>NJ2334 VH</b>
<b>180</b>	380	126	4		1900	2700	400	<b>NJ2336 VH</b>
<b>190</b>	400	132	5		2080	2900	400	<b>NJ2338 VH</b>
<b>200</b>	420	138	5		2320	3250	380	<b>NJ2340 VH</b>

d	Dimensions			Mass
	F	D <sub>1</sub>	d <sub>1</sub>	
<b>mm</b>				<b>kN</b>
<b>100</b>	120,6 120,6 119,3 106,5	150 150 173,7	129 129 131,5	6,684 6,684 13,0 0,382
<b>110</b>	133,35	194,2	147	17,8
<b>120</b>	147,4	214	162,5	22,3
<b>130</b>	152 157,95	196,8 229,9	163,2 174,1	11,11 27,9
<b>140</b>	168,46	245,3	184,7	34,9
<b>150</b>	182,5	265,7	201,2	41,6
<b>160</b>	196,55	286	216,7	48,8
<b>170</b>	203,56	296,4	224,5	59,2
<b>180</b>	221,74	314,6	242,6	69,6
<b>190</b>	224,6	327	247,6	80,0
<b>200</b>	238,65	347,5	263,2	91,6

## Cylindrical roller bearings, single row

Non-standardized

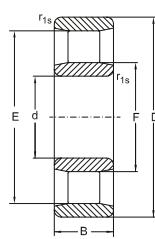


fig. 1



fig. 2



fig. 3

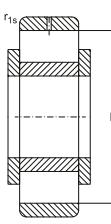


fig. 4



fig. 5

Dimensions							Fig. Basical radial load		Speed limit	Mass	Designation			
d	D	B	C	r <sub>s</sub>	r <sub>1s</sub>	E	F	C <sub>r</sub>	C <sub>0r</sub>					
mm							kN							
<b>50,8</b>	110	45,3	44,5	2	1,5	95,5	65,5	5	164	195	4300	5600	2,23	<b>NUNB5210 MW44</b>
<b>58</b>	96	51,6	43,6	1,5	1,5	86	68	4	160	146	4300	6000	1,30	<b>NUN5212</b>
	96	51,6	43,6		0,3		68	4	159	264	6400	8000	1,378	<b>NUN5212 FC3</b>
	96	51,6	43,6	1,3	1,3	86	68	5	160	146	4300	6000	1,38	<b>NUNB5212 FC3</b>
<b>65</b>	120	52,4		1,5	0,6	104,8	79,7	1	203	298	3600	4800	2,60	<b>NUN5613</b>
<b>70</b>	125	60,3		1,5	0,6	109,6	84,1	1	229	353	3400	4500	3,10	<b>NUN5114</b>
<b>80</b>	140	46		2	0,6	122,3	93,7	1	208	297	3000	4000	2,98	<b>NUN5216</b>
	140	66,6		2	2	123,8	95,2	1	329	541	3000	4000	4,44	<b>NUN5716 F2</b>
<b>85</b>	150	49,2		2	2	133,4	101,6	1	272	359	2800	3800	3,82	<b>NUN3217 W20</b>
<b>95</b>	170	55,6		3	2,1	151,1	113,5	1	363	536	2600	3400	5,16	<b>NUN2R3219 F2</b>
	170	55,6		3	2,1	151,1	113,5	1	363	536	2600	3400	5,67	<b>NUN3219 W20F2</b>
<b>101,6</b>	139	76,2		2	1,5	139,6	114,2	1	358	685	2800	3800	4,74	<b>NUN5320 W33F2</b>
<b>152,4</b>	209,55	53,975		1,25	2,5	165	165	3	345	626	2600	3300	5,700	<b>B6460</b>
<b>180</b>	310	149				215	1	1512	2670	2000	2500	51,95	<b>NUN5136 M</b>	
<b>285,75</b>	387,35	69,85		2,5		318	2	743	1534	1400	1800	23,933	<b>49137</b>	
<b>345</b>	406	28			1,5	362	1	215	486	1300	1600	7,215	<b>NUN5169 M</b>	

**Cylindrical roller bearings, single row  
Combined roller thrust ball bearings**

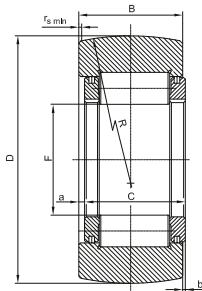


fig. 1

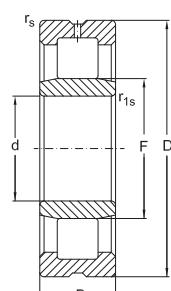


fig. 2

Dimensions						Fig.	Basical radial load	Mass	Designation	
$d$	$D$	$D_1$	$B$	$r_s$	$r_{1s}$	E, F	dyn.	stat.		
mm						kN				
20	52		21	1,1	0,3	25,77	2	49,7	45,3	ZRL2443
190	170		60	1	6	80,03	1	219,2	292,4	482916 VH50

## Cylindrical roller bearings, single row

Non-standardized

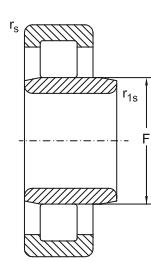


fig. 7

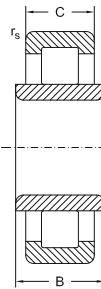


fig. 8

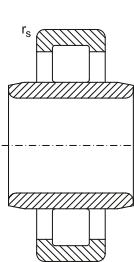


fig. 9

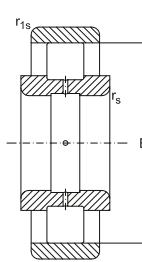


fig. 10

d mm	D mm	B mm	C mm	Dimensions		Fig. min	Basical radial load dyn.	Speed limit kN	Mass kg	Designation
				$r_s$	$r_{1s}$		$C_r$			
<b>20</b>	47	18	14	1	0,6	26,5	8	25,7	22,6	15000 18000 0,112 NUB204 E
<b>25</b>	52	18	15	1	0,6	31,5	8	29,3	27,7	12000 15000 0,140 NUB205 E
	62	24	17	1,1	1,1	34	8	41,2	37	10000 13000 0,243 NUB305 E
<b>30</b>	62	20	16	1	0,6	37,5	8	39,7	37,9	10000 13000 0,24 NUB206 E
<b>40</b>	80	23	18	1,1	1,1	49,5	8	53,1	52,1	8000 9500 0,47 NUB208 E
	80	23	18	1,1	1,1	49,5	8	53,1	52,1	8000 9500 0,47 NUB208 EK
<b>45</b>	85	23	19	1,1	1,1	54,5	8	61,7	64,6	7500 9000 0,46 NUB209 E
<b>50</b>	90	23	20	1,1	1,1	59,5	8	63,7	68,3	6700 8000 0,52 NUB210 E
	90	40	20	2	1,5	60,4	8	47,8	50,4	6000 7000 0,641 NUB5110 NA
<b>50,8</b>	110	45,3	44,5	2	2	65,5	10	164	195	5600 6700 2,11 NB5210 S3W44
<b>60</b>	110	28	22	1,5	1,5	72	8	94	102,3	5600 6700 0,93 NUB212 E
<b>65</b>	120	31	23	1,5	1,5	78,5	8	108	119	5300 6300 1,18 NUB213 E
	120	48	23	1,5	1,5	79,6	8	105	115	4800 5600 1,39 NUB5313 NA
	140	49	33	2,1	2,1	83,5	8	134	137	4000 4800 2,52 NUB5213 NA
	140	66	33	2	2	83,5	9	135	139	4800 6000 2,82 NUB5413 NA
<b>75</b>	130	31	25	1,5	1,5	88,5	8	130	156	4800 5600 1,39 NUB215 E
	160	55	37	2,1	2,1	95	8	239	261	3800 4600 3,7 NUB315 E
<b>85</b>	150	54	28	2	2	101,8	8	121	141	4300 5000 1,89 NUB217
	150	36	28	2	2	100,5	8	164	194	4300 5000 1,89 NUB217 E
<b>170</b>	310	76	52	4	4	208	8	499	677	1300 1800 21,4 NUB234 MAC3F2
	310	116	86	4	4	208	8	784	1141	1700 2000 31,9 NUB2234 MC3

## Split cylindrical roller bearings, single row

Non-standardized

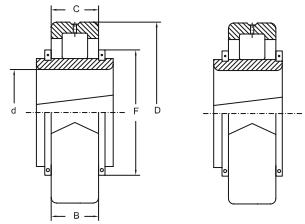


fig. 1

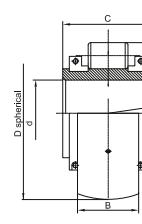


fig. 2

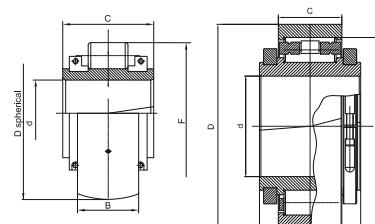


fig. 3

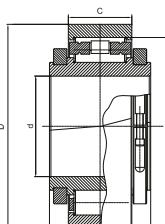


fig. 4

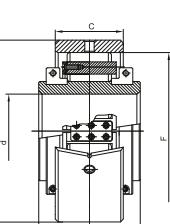


fig. 5

Dimensions					Fig.	Basical radial load dyn. $C_r$	Speed limit	Mass	Designation	
d	D	B	C	F		stat. $C_{0r}$			Grease	
mm					kN					
127	254	114,3	63,5	193	1	570	745	850	22,3	NUBS5125 MA
130	222,25	98,5	54	180	4	367	503	2400	12,3	NBS5126 M
145	250	80	117,5	225	3	665	1402		18,9	493829 VC4NAS1
220	393,757	156	90,5	324,2	2	1156	1680	530	73,6	NUBS5144 MA
300	438	143	74,5	388	5	850	1549	1200	58,7	NBS5160 MC3NA

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



315

URB



# Double Row Cylindrical Roller Bearings

## Standards, Boundary dimensions

Standard plans DIN 616  
Double row cylindrical roller bearings,  
DIN 5412 / part 4

## General

Double Row Cylindrical Roller Bearings of series NN30.. and NNU 49 are separable radial bearings.

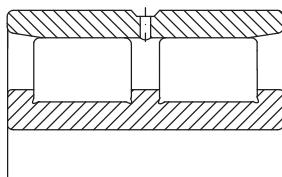
They are frequently used as non - locating bearings arrangements of working spindles for machine tools. Therefore, these bearings are often used in high precision tolerance class, frequently in combination with reduced internal clearance. These bearings also feature high radial load capacity and are satisfactory for high speed applications, providing a very stiff and rigid bearing arrangement. They are also commonly used with tapered bores, namely suffix K, (i.e. taper 1:12).

## Design variants of Double Row Cylindrical Roller Bearings

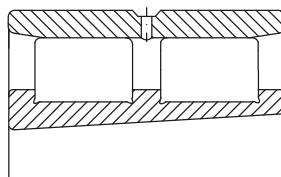
Double Row Cylindrical Roller Bearings of series NN 30.. and NNU 49.. are produced and available either with or without tapered bores, as standard (see also Abb. 1).

Bearings of series NN 30.. comprise of a plain outer ring and an inner ring with three integral shoulders to guide the two separate rows of rollers around the raceway. These bearing series are produced with lubrication facilities in their outer ring, such as a circumferential lubrication groove and holes as standard, namely suffix W33.

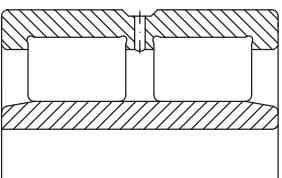
Unlike the NN30.. series the double row cylindrical roller bearings of the NNU 49.. series feature opposite internal design characteristics, (i.e. outer ring with 3 integral shoulders around the raceway and a plain inner ring). These bearing series also feature lubrication facilities in their outer ring as standard, also namely, suffix W33.



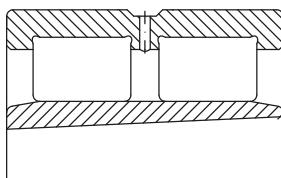
NN30..W33



NN30..K..W33



NNU49..W33



NNU49..K..W33

Cylindrical roller bearings of series BB30.. and NNU49.. allow for compensation of length changes within the bearings itself. In this way they are ideal non-locating bearings.

Both bearing rings may be mounted with heavy interference fit to shaft and housing.

## Misalignment

Double Row Cylindrical Roller bearings are not able to accomodate misalignments.

## Tolerances

**Double Row Cilindrical Roller Bearings of series NN 30.. and NNU 49..** are frequently used as spindle bearings.

Consequently, they are also available with closer tolerance classes, such as P4 or SP, as standard.

On request these bearings are also be produced to other tolerance classes.

Detailed tolerance values, for URB double row cylindrical roller bearings and URB double row cylindrical roller bearings in spindle bearing design, tolerance class SP, are listed in the table shown in the chapter "Bearing tolerances" page 33.

## Cages

URB Double Row Cylindrical Roller Bearings of the series NN 30.. and NNU 49.. are produced with roller riding solid brass cages as standard.

## Internal clearance

**URB Double Row Cylindrical Roller Bearings** are produced with normal internal clearance (clearance group CN, historically designated C0) as standard. Other internal radial clearances are produced upon order request.

### NOTE:

**URB Double Row Cylindrical Roller Bearings** of series NN 30.. and NNU 49.. produced to high precision design are frequently used with reduced internal radial clearance (clearance group C1).

As these bearings are produced to very closed tolerances, under no circumstances should

components be mixed or exchanged with other bearing parts.

The value of internal clearance groups of URB Cylindrical Roller Bearings are listed in the tables on page 206.

These Values conform, as far as they are standardised, and conform to DIN 620/part 4 and ISO 5753-1991, respectively.

## Minimum load

The minimum load applied to fast rotating double row cylindrical roller bearings should be higher than 4 % of its dynamic load rating  $C_r$ .

## Equivalent Dynamic bearing load

Since double Row Cylindrical Roller Bearings of series NN 30.. and NNU 49.. are non - locating bearings, they are not able to accomodate any thrust loads.

$$P = F_r$$

## Equivalent static bearing load

For Single and Double row cylindrical roller bearings:

$$P_0 = F_r$$

## Mounting

When handling High Precision double row cylindrical roller bearings particular attention must be paid to the relevant instructions of fitting and mounting of these bearings.

When double row cylindrical roller bearings, with tapered inner bores, are mounted the effect on the running clearance can be adjusted to obtain a specific clearance or preload.

As these bearing types are separable under no circumstances should either components or assembled bearings be mixed or exchanged with other bearing parts.

### **Abutment and fillet dimensions for Double row cylindrical roller bearings**

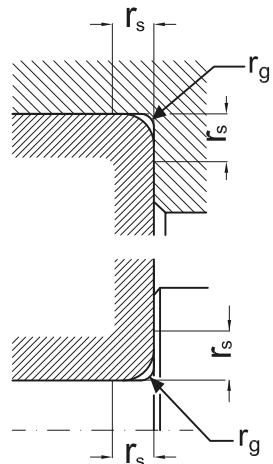
The bearing rings must only contact adjacent parts with their side faces. The bearing corners must not touch the corner fillet radii or either the shaft or housing corners.

Therefore, the largest fillet radius ( $r_g$ ) must be smaller than the minimum fillet dimension of the bearings rings ( $r_s$ ) as listed in the bearing tables, also see next page.

Recommendations for the dimensions of adjacent parts are listed in **DIN 5418**.

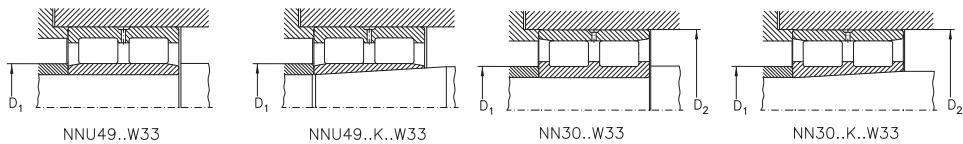
### **Abutment and fillet dimensions for Double Row Cylindrical Roller Bearings**

Dimensions are in [mm]



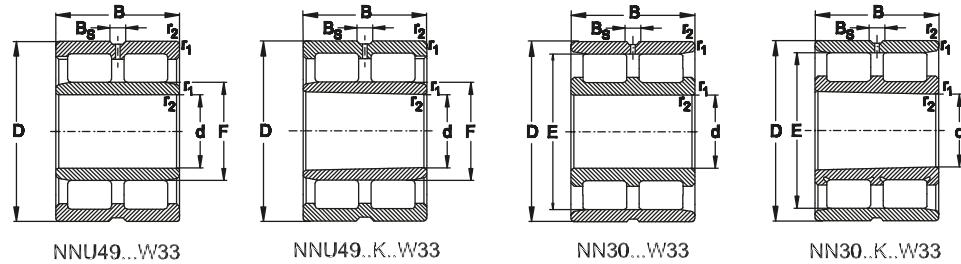
## Abutment and fillet dimension for Double row Cylindrical Roller Bearings

All dimensions are in [mm]



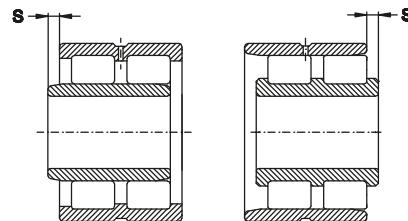
Shaft diameter <b>d</b>	for Bearings series					
	NNU 49, NNU 49 K		NN 30, NN 30 K			
	Type	<b>D<sub>1</sub></b> max	Type	<b>D<sub>1</sub></b> min	<b>D<sub>2</sub></b> min	<b>D<sub>2</sub></b> max
<b>mm</b>						
30	-	-	<b>NN3006</b>	35	49	50
35	-	-	<b>NN3007</b>	40	56	57
40	-	-	<b>NN3008</b>	45	62	63
45	-	-	<b>NN3009</b>	50	69	70
50	-	-	<b>NN3010</b>	55	74	75
55	-	-	<b>NN3011</b>	61	82	84
60	-	-	<b>NN3012</b>	66	87	89
65	-	-	<b>NN3013</b>	71	92	94
70	-	-	<b>NN3014</b>	76	102	104
75	-	-	<b>NN3015</b>	81	107	109
80	-	-	<b>NN3016</b>	86	115	119
85	-	-	<b>NN3017</b>	91	120	124
90	-	-	<b>NN3018</b>	98	129	133
95	-	-	<b>NN3019</b>	103	134	137
100	<b>NNU4920</b>	112	<b>NN3020</b>	108	139	142
105	<b>NNU4921</b>	117	<b>NN3021</b>	114	148	151
110	<b>NNU4922</b>	122	<b>NN3022</b>	119	157	161
120	<b>NNU4924</b>	133	<b>NN3024</b>	129	167	171
130	<b>NNU4926</b>	145	<b>NN3026</b>	139	184	191
140	<b>NNU4928</b>	155	<b>NN3028</b>	149	194	201
150	<b>NNU4930</b>	167	<b>NN3030</b>	160	208	215
160	<b>NNU4932</b>	177	<b>NN3032</b>	170	222	230
170	<b>NNU4934</b>	187	<b>NN3034</b>	180	239	250
180	<b>NNU4936</b>	200	<b>NN3036</b>	190	258	270
190	<b>NNU4938</b>	210	<b>NN3038</b>	200	268	280
200	<b>NNU4940</b>	223	<b>NN3040</b>	210	285	300
220	<b>NNU4944</b>	243	<b>NN3044</b>	232	313	328
240	<b>NNU4948</b>	263	<b>NN3048</b>	252	334	348
260	<b>NNU4952</b>	289	<b>NN3052</b>	275	368	385
280	<b>NNU4956</b>	309	<b>NN3056</b>	295	388	405
300	<b>NNU4960</b>	335	<b>NN3060</b>	315	422	445
320	<b>NNU4964</b>	335	<b>NN3064</b>	335	442	465

## Double Row Cylindrical Roller Bearings



Dimensions			Basical radial load		Speed limit		Designation	
d	D	B	min. $r_1, r_2$	dyn. $C_r$	stat. $C_{0r}$	grease	oil	
mm			kN		$\text{min}^{-1}$			
<b>30</b>	55	19	1	29	34	16000	19000	<b>NN3006 MW33</b>
	55	19	1	29	34	16000	19000	<b>NN3006 KMW33</b>
<b>35</b>	62	20	1	39,3	50	14000	17000	<b>NN3007 MW33</b>
	62	20	1	39,3	50	14000	17000	<b>NN3007 KMW33</b>
<b>40</b>	68	21	1	45	58,5	12000	15000	<b>NN3008 MW33</b>
	68	21	1	45	58,5	12000	15000	<b>NN3008 KMW33</b>
<b>45</b>	75	23	1	54	72	11000	14000	<b>NN3009 MW33</b>
	75	23	1	54	72	11000	14000	<b>NN3009 KMW33</b>
<b>50</b>	80	23	1	57	80	10000	13000	<b>NN3010 MW33</b>
	80	23	1	57	80	10000	13000	<b>NN3010 KMW33</b>
<b>55</b>	90	26	1,1	72	100	9000	11000	<b>NN3011 MW33</b>
	90	26	1,1	72	100	9000	11000	<b>NN3011 KMW33</b>
<b>60</b>	95	26	1,1	75	110	8500	10000	<b>NN3012 MW33</b>
	95	26	1,1	75	110	8500	10000	<b>NN3012 KMW33</b>
<b>65</b>	100	26	1,1	76,5	118	8000	9500	<b>NN3013 MW33</b>
	100	26	1,1	76,5	118	8000	9500	<b>NN3013 KMW33</b>
<b>70</b>	110	30	1,1	98	151	7000	8500	<b>NN3014 MW33</b>
	110	30	1,1	98	151	7000	8500	<b>NN3014 KMW33</b>
<b>75</b>	115	30	1,1	100	156	6700	8000	<b>NN3015 MW33</b>

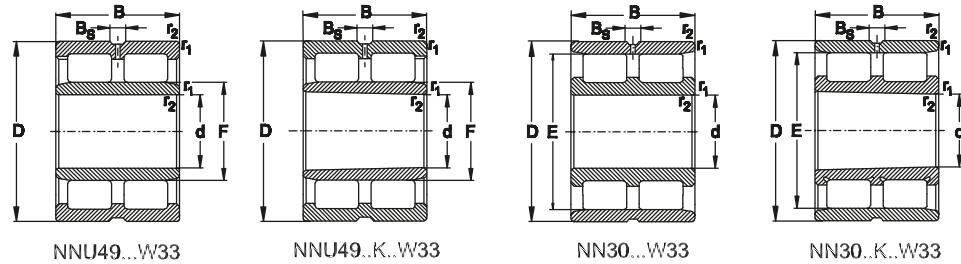
## Double Row Cylindrical Roller Bearings



*Abutment and fillet dimensions  
see on page 319*

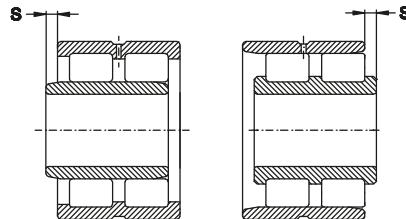
d	E	F	Bearing dimensions		Mass [kg]
			B <sub>s</sub>	s	
<b>mm</b>					
<b>30</b>	48,5	-	4,8	1,4	0,12
	48,5	-	4,8	1,4	0,12
<b>35</b>	55	-	4,8	1,4	0,26
	55	-	4,8	1,4	0,26
<b>40</b>	61	-	4,8	1,4	0,32
	61	-	4,8	1,4	0,32
<b>45</b>	67,5	-	4,8	1,7	0,41
	67,5	-	4,8	1,7	0,41
<b>50</b>	72,5	-	4,8	1,7	0,43
	72,5	-	4,8	1,7	0,43
<b>55</b>	81	-	4,8	1,9	0,65
	81	-	4,8	1,9	0,65
<b>60</b>	86,1	-	4,8	1,9	0,67
	86,1	-	4,8	1,9	0,67
<b>65</b>	91	-	4,8	1,9	0,74
	91	-	4,8	1,9	0,74
<b>70</b>	100	-	6,5	2,3	1,1
	100	-	6,5	2,3	1,1
<b>75</b>	105	-	6,5	2,3	1,1

## Double Row Cylindrical Roller Bearings



Dimensions			Basical radial load		Speed limit		Designation	
d	D	B	$r_1, r_2$ min.	dyn. $C_r$	stat. $C_{0r}$	grease	oil	
mm			kN		$\text{min}^{-1}$			
<b>75</b>	115	30	1,1	100	156	6700	8000	<b>NN3015 KMW33</b>
<b>80</b>	125	34	1,1	120	186	6300	7500	<b>NN3016 MW33</b>
	125	34	1,1	120	186	6300	7500	<b>NN3016 KMW33</b>
<b>85</b>	130	34	1,1	125	200	6000	7000	<b>NN3017 MW33</b>
	130	34	1,1	125	200	6000	7000	<b>NN3017 KMW33</b>
<b>90</b>	140	37	1,5	141	224	5600	6700	<b>NN3018 MW33</b>
	140	37	1,5	141	224	5600	6700	<b>NN3018 KMW33</b>
<b>95</b>	145	37	1,5	146	236	5300	6300	<b>NN3019 MW33</b>
	145	37	1,5	146	236	5300	6300	<b>NN3019 KMW33</b>
<b>100</b>	140	40	1,1	129	255	5300	6300	<b>NNU4920 MW33</b>
	140	40	1,1	129	255	5300	6300	<b>NNU4920 KMW33</b>
	150	37	1,5	152	264	5300	6300	<b>NN3020 MW33</b>
	150	37	1,5	152	264	5300	6300	<b>NN3020 KMW33</b>
<b>105</b>	145	40	1,1	129	260	5300	6300	<b>NNU4921 MW33</b>
	145	40	1,1	129	260	5300	6300	<b>NNU4921 KMW33</b>
	160	41	2	192	310	4800	5600	<b>NN3021 MW33</b>
	160	41	2	192	310	4800	5600	<b>NN3021 KMW33</b>
<b>110</b>	150	40	1,1	132	270	5000	6000	<b>NNU4922 MW33</b>
	150	40	1,1	132	270	5000	6000	<b>NNU4922 KMW33</b>

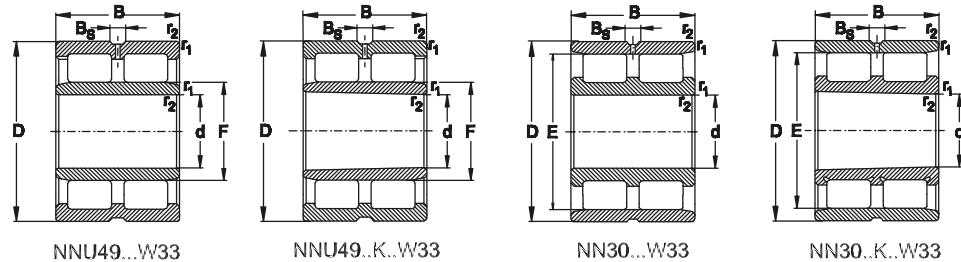
## Double Row Cylindrical Roller Bearings



*Abutment and fillet dimensions  
see on page 319*

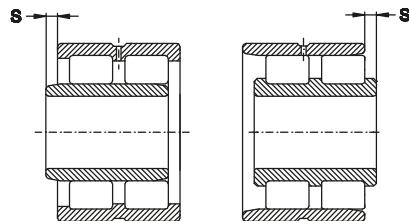
Bearing dimensions				Mass	
d	E	F	B <sub>s</sub>	s	[kg]
<b>mm</b>					
<b>75</b>	105	-	6,5	2,3	1,1
<b>80</b>	113	-	6,5	2,5	1,6
	113	-	6,5	2,5	1,6
<b>85</b>	118	-	6,5	2,5	1,6
	118	-	6,5	2,5	1,6
<b>90</b>	127	-	6,5	2,5	2,1
	127	-	6,5	2,5	2,1
<b>95</b>	132	-	6,5	2,5	2,3
	132	-	6,5	2,5	2,3
<b>100</b>	-	113	6,5	2	1,9
	-	113	6,5	2	1,9
	137	-	6,5	2,5	2,2
	137	-	6,5	2,5	2,2
<b>105</b>	-	118	6,5	1,5	2
	-	118	6,5	1,5	2
	146	-	6,5	2,6	3
	146	-	6,5	2,6	3
<b>110</b>	-	123	6,5	1,5	2,1
	-	123	6,5	1,5	2,1

## Double Row Cylindrical Roller Bearings



Dimensions			Basical radial load		Speed limit		Designation	
d	D	B	min. $r_1, r_2$	dyn. $C_r$	stat. $C_{or}$	grease min <sup>-1</sup>	oil	
mm			kN		min <sup>-1</sup>			
<b>110</b>	170	45	2	226	365	4500	5300	<b>NN3022 MW33</b>
	170	45	2	226	365	4500	5300	<b>NN3022 KMW33</b>
<b>120</b>	165	45	1,1	176	340	4500	5300	<b>NNU4924 MW33</b>
	165	45	1,1	176	340	4500	5300	<b>NNU4924 KMW33</b>
	180	46	2	235	405	4300	5000	<b>NN3024 MW33</b>
	180	46	2	235	405	4300	5000	<b>NN3024 KMW33</b>
<b>130</b>	180	50	1,5	193	390	4000	4800	<b>NNU4926 MW33</b>
	180	50	1,5	193	390	4000	4800	<b>NNU4926 KMW33</b>
	200	52	2	294	510	3800	4500	<b>NN3026 MW33</b>
	200	52	2	294	510	3800	4500	<b>NN3026 KMW33</b>
<b>140</b>	190	50	1,5	190	400	3800	4500	<b>NNU4928 MW33</b>
	190	50	1,5	190	400	3800	4500	<b>NNU4928 KMW33</b>
	210	53	2	305	520	3600	4300	<b>NN3028 MW33</b>
	210	53	2	305	520	3600	4300	<b>NN3028 KMW33</b>
<b>150</b>	210	60	2	326	655	3600	4300	<b>NNU4930 MW33</b>
	210	60	2	326	655	3600	4300	<b>NNU4930 KMW33</b>
	225	56	2	339	600	3400	4000	<b>NN3030 MW33</b>
	225	56	2	339	600	3400	4000	<b>NN3030 KMW33</b>
<b>160</b>	220	60	2	335	680	3400	4000	<b>NNU4932 MW33</b>
	220	60	2	335	680	3400	4000	<b>NNU4932 KMW33</b>

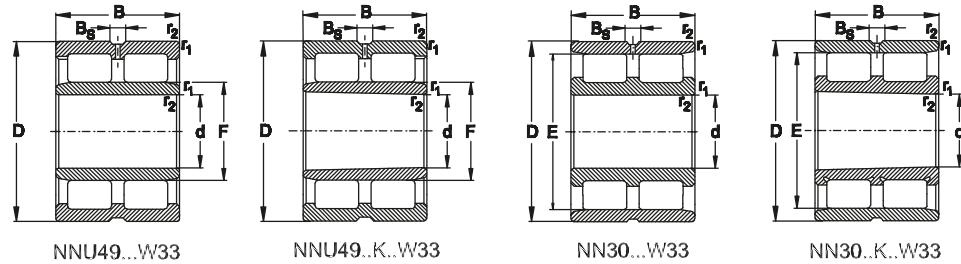
## Double Row Cylindrical Roller Bearings



*Abutment and fillet dimensions  
see on page 319*

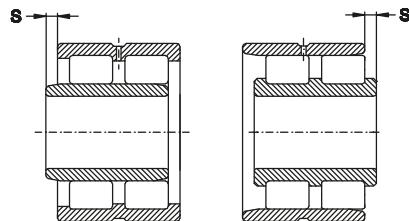
d	E	Bearing dimensions			Mass [kg]
		F	B <sub>s</sub>	S	
mm					
<b>110</b>	155	-	6,5	2,8	3,8
	155	-	6,5	2,8	3,8
<b>120</b>	-	134,5	6,5	1,5	2,76
	-	134,5	6,5	1,5	2,76
	165	-	6,5	3,1	4,1
	165	-	6,5	3,1	4,1
<b>130</b>	-	146	6,5	2	3,79
	-	146	6,5	2	3,79
	182	-	9,5	3,35	6,1
	182	-	9,5	3,35	6,1
<b>140</b>	-	156	6,5	2	4,11
	-	156	6,5	2	4,11
	192	-	9,5	3,35	6,5
	192	-	9,5	3,35	6,5
<b>150</b>	-	168,5	6,5	2,3	6,2
	-	168,5	6,5	2,3	6,2
	206	-	9,5	3,7	7,9
	206	-	9,5	3,7	7,9
<b>160</b>	-	178,5	6,5	2,3	6,55
	-	178,5	6,5	2,3	6,55

## Double Row Cylindrical Roller Bearings



Dimensions			Basical radial load		Speed limit		Designation	
d	D	B	min. $r_1, r_2$	dyn. $C_r$	stat. $C_{or}$	grease min <sup>-1</sup>	oil	
mm			kN		min <sup>-1</sup>			
<b>160</b>	240	60	2,1	388	670	3200	3800	<b>NN3032 MW33</b>
	240	60	2,1	388	670	3200	3800	<b>NN3032 KMW33</b>
<b>170</b>	230	60	2	340	720	3200	3800	<b>NNU4934 MW33</b>
	230	60	2	340	720	3200	3800	<b>NNU4934 KMW33</b>
	260	67	2,1	458	810	3000	3600	<b>NN3034 MW33</b>
	260	67	2,1	458	810	3000	3600	<b>NN3034 KMW33</b>
<b>180</b>	250	69	2	405	877	3000	3600	<b>NNU4936 MW33</b>
	250	69	2	405	877	3000	3600	<b>NNU4936 KMW33</b>
	280	74	2,1	576	1080	2800	3400	<b>NN3036 MW33</b>
	280	74	2,1	576	1080	2800	3400	<b>NN3036 KMW33</b>
<b>190</b>	260	69	2	412	910	2800	3400	<b>NNU4938 MW33</b>
	260	69	2	412	910	2800	3400	<b>NNU4938 KMW33</b>
	290	75	2,1	614	1088	2600	3200	<b>NN3038 MW33</b>
	290	75	2,1	614	1088	2600	3200	<b>NN3038 KMW33</b>
<b>200</b>	280	80	2,1	490	1040	2600	3200	<b>NNU4940 MW33</b>
	280	80	2,1	490	1040	2600	3200	<b>NNU4940 KMW33</b>
	310	82	2,1	715	1271	2400	3000	<b>NN3040 MW33</b>
	310	82	2,1	715	1271	2400	3000	<b>NN3040 KMW33</b>
<b>220</b>	300	80	2,1	535	1321	2400	3000	<b>NNU4944 MW33</b>
	300	80	2,1	535	1321	2400	3000	<b>NNU4944 KMW33</b>

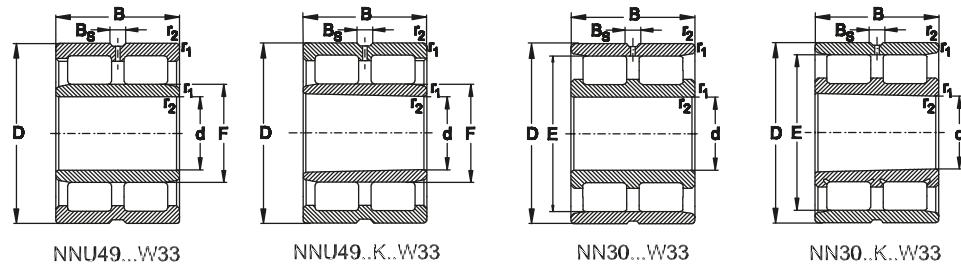
## Double Row Cylindrical Roller Bearings



*Abutment and fillet dimensions  
see on page 319*

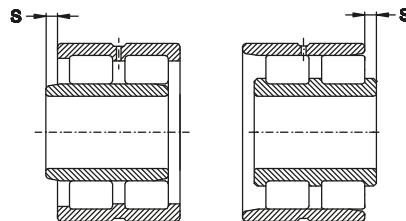
Bearing dimensions					Mass
d	E	F	B <sub>s</sub>	S	
<b>mm</b>					[kg]
<b>160</b>	219	-	9,5	4,2	9,6
	219	-	9,5	4,2	9,6
<b>170</b>	-	188,5	6,5	2,3	6,85
	-	188,5	6,5	2,3	6,85
	236	-	9,5	4,5	13
	236	-	9,5	4,5	13
<b>180</b>	-	202	9,5	2,6	10,2
	-	202	9,5	2,6	10,2
	255	-	12,2	4,8	17
	255	-	12,2	4,8	17
<b>190</b>	-	212	9,5	2,6	10,6
	-	212	9,5	2,6	10,6
	265	-	12,2	4,8	18
	265	-	12,2	4,8	18
<b>200</b>	-	225	12,2	3,4	14,9
	-	225	12,2	3,4	14,9
	282	-	12,2	5,3	23
	282	-	12,2	5,3	23
<b>220</b>	-	245	12,2	3,4	16,2
	-	245	12,2	3,4	16,2

## Double Row Cylindrical Roller Bearings



Dimensions			Basical radial load		Speed limit		Designation	
d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>or</sub>	grease min <sup>-1</sup>	oil	
mm			kN		min <sup>-1</sup>			
<b>220</b>	340	90	3	890	1591	2200	2800	<b>NN3044 MW33</b>
	340	90	3	890	1591	2200	2800	<b>NN3044 KMW33</b>
<b>240</b>	320	80	2,1	556	1300	2200	2800	<b>NNU4948 MW33</b>
	320	80	2,1	556	1300	2200	2800	<b>NNU4948 KMW33</b>
	360	92	3	850	1560	2000	2600	<b>NN3048 MW33</b>
	360	92	3	850	1560	2000	2600	<b>NN3048 KMW33</b>
<b>260</b>	360	100	2,1	750	1700	2000	2600	<b>NNU4952 MW33</b>
	360	100	2,1	750	1700	2000	2600	<b>NNU4952 KMW33</b>
	400	104	4	1060	2000	1900	2400	<b>NN3052 MW33</b>
	400	104	4	1060	2000	1900	2400	<b>NN3052 KMW33</b>
<b>280</b>	380	100	2,1	765	1800	1900	2400	<b>NNU4956 MW33</b>
	380	100	2,1	765	1800	1900	2400	<b>NNU4956 KMW33</b>
	420	106	4	1080	2080	1800	2200	<b>NN3056 MW33</b>
	420	106	4	1080	2080	1800	2200	<b>NN3056 KMW33</b>
<b>300</b>	420	118	3	1188	2943	1700	2000	<b>NNU4960 MW33</b>
	420	118	3	1188	2943	1700	2000	<b>NNU4960 KMW33</b>
	460	118	4	1270	2400	1600	1900	<b>NN3060 MW33</b>
	460	118	4	1270	2400	1600	1900	<b>NN3060 KMW33</b>
<b>320</b>	440	118	3	1060	2550	1600	1900	<b>NNU4964 KMW33</b>
	480	121	4	1320	2600	1600	1900	<b>NN3064 MW33</b>

## Double Row Cylindrical Roller Bearings

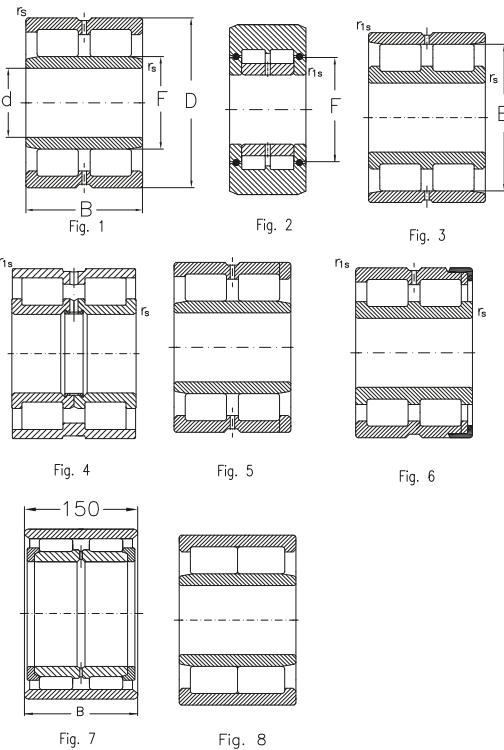


*Abutment and fillet dimensions  
see on page 319*

Bearing dimensions					Mass
d	E	F	B <sub>s</sub>	S	[kg]
<b>mm</b>					
<b>220</b>	310	-	15	4,5	33
	310	-	15	4,5	33
<b>240</b>	-	265	12	3,4	17,4
	-	265	12	3,4	17,4
	330	-	15	6	36
	330	-	15	6	36
<b>260</b>	-	292	15	4	30,2
	-	292	15	4	30,2
	364	-	15	6,5	48
	364	-	15	6,5	48
<b>280</b>	-	312	15	4	32,2
	-	312	15	4	32,2
	384	-	15	6,75	52
	384	-	15	6,75	52
<b>300</b>	-	339	17,7	5	50
	-	339	17,7	5	50
	418	-	17,7	7,45	72
	418	-	17,7	7,45	72
<b>320</b>	-	359	17,7	5	52,7
	438	-	17,7	7,95	77

## Cylindrical Roller Bearings, double row

Non-standardized



d	D	B	Dimensions			Fig.	Basical radial load dyn.	$C_r$	$C_{0r}$	Speed limit	Mass	Designation
			$r_s$	$r_{1s}$	E, F min							
mm												
<b>30</b>	62	24	1	0,6	38	8	47,5	48,8	2400	3000	0,364	<b>2NNU5106 M</b>
<b>40</b>	68	37	0,8	0,6	61	4	79	116	3200	4000	0,525	<b>NNF5008 VS3</b>
	68	38	0,8	0,6	61	4	79	116	3200	4000	0,535	<b>NNF5008 VS3A1</b>
<b>52</b>	110	125	1	72	13	218	303	1900	2300	3,99	<b>480911</b>	
<b>90</b>	125	35	1,1	115,5	6	148	301	1600	2000	1,343	<b>NNC4918 VW33</b>	
<b>120</b>	190	80	1,1	1,1	137	1	417	701	2400	3000	8,30	<b>NNU5124 M</b>
<b>130</b>	180	50	1,5	1,5	165,4	5	252	526	900	1300	3,90	<b>NNP4926 VW33</b>
	180	50	1,5	1,5	165,4	5	252	526	900	1300	3,90	<b>NNP4926 VW1</b>
<b>135</b>	220	145	2	2	192	7	611	1360	2200	2600	21,2	<b>2NUNJ5127 MC3</b>
	220	150	1	194	7	650	1363	2700	3400	23,014		<b>LII-68853</b>
<b>150</b>	300	120	4	182	2	984	1645	800	1000	45,285		<b>NNU5130 VW44C3</b>
<b>169,5</b>	280	105	4	4	197	8	800	2000	1700	2000	27,3	<b>2NNU5134 MNAC5</b>
	280	105	3		197	1	955	1680	2200	2700	27,327	<b>NNU5134 MNA</b>
	280	105	3		197	1	955	1680	2200	2700	27,327	<b>NNU5134 MNAC5</b>
<b>170</b>	230	60	2	1,5	215	3	423	944	1800	2200	7,51	<b>NN5234 C3</b>
<b>177,8</b>	258,175	196,469	4	5	198,5	1	1258	2650	1700	2000	35,5	<b>NNU5136 MC190W5</b>
<b>180</b>	280	135	0,6	3,5	260,22	13	1350	2543	300		30,1	<b>NNF5036 V</b>
<b>220</b>	300	80	2,1	2,1	276,5	4	665	1592	450	800	17	<b>NNC4944 VW33</b>
<b>260</b>	320	60	2	2	304,7	6	500	1402	400	700	10,7	<b>NNC4852 VW33</b>

## Cylindrical roller bearings, double row and three row

Non-standardized

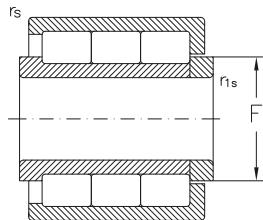


Fig. 9

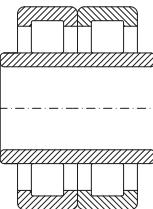


Fig. 10

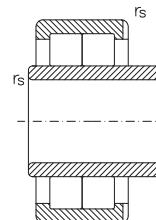


Fig. 11

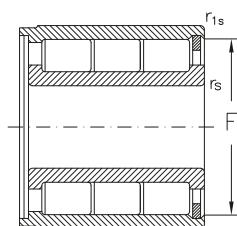


Fig. 12

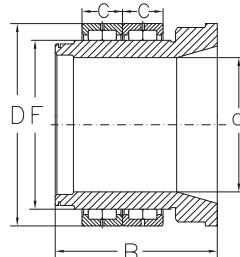


Fig. 13

d	D	B	C	Dimensions		Fig.	Basical radial load dyn. stat. $C_r$	Speed limit	Mass	Designation			
				$r_s$	$r_{1s}$ min E, F								
mm													
<b>65,019</b>	110	140		1,5	1	86,9	13	208	474	5700	7200	4,121	<b>CR0113.13 V</b>
<b>105</b>	190	80	75	1,5	1,5	124	9	367	1020	850	1200	10,9	<b>3NNUPB5121 VC4</b>
<b>120</b>	215	130	98	2,1	2,1	143,5	10	584	905	1000	2600	16,6	<b>2NUB5224 MAP54S1</b>
<b>130</b>	182	81,5		2	2	170,4	12	495	1083	1200	1500	6,020	<b>3NN5226 VP5</b>
<b>205</b>	310	110	66	2,1	2,1	240	11	500	1610	560	800	26,2	<b>NNUB5141 VC3</b>
<b>260</b>	400	247	145	5	5	296	11	1675	3300	950	1300	83,5	<b>NNUB5252 MC3W8</b>

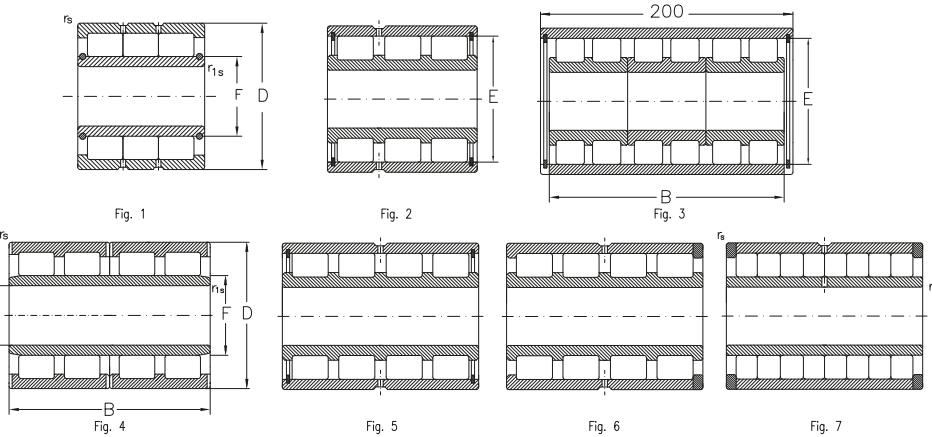


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URB

## Cylindrical roller bearings, three row and four row

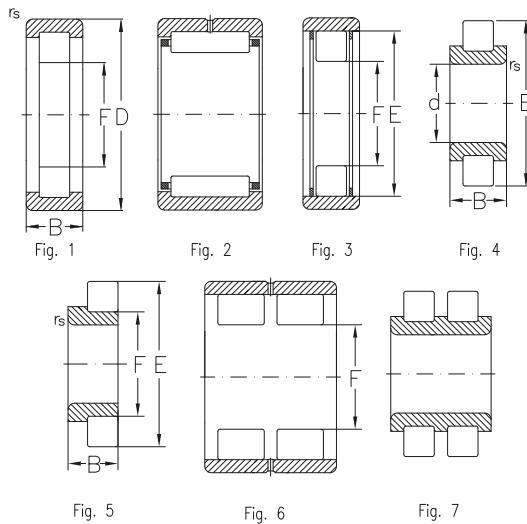
Non-standardized



d	D	B	Dimensions		Fig.	Basical radial load dyn.	Speed limit	Mass	Designation			
			$r_s$	$r_{1s}$								
mm												
						kN						
<b>80</b>	125	80	1,1	94,5	7	353	833	1700	2100	4,094	<b>NNU6016 VC3</b>	
<b>90</b>	125	68	1,5	1,5	115	5	856	596	1500	1900	2,66	<b>4NN5118 VW33</b>
<b>140</b>	215	100	3	3	160,1	1	751	1576	2200	2600	13,7	<b>3NNU5128 V</b>
<b>160</b>	230	168	1,5	1,5	179	4	300	539	2400	3000	23,570	<b>4NNU5232 PMC3</b>
	230	168	1,5	1,5	179	4	300	539	2400	3000	23,6	<b>4NNU5232 PMW8</b>
	240	130	2	2	180	4	739	1473	1900	2200	22,0	<b>4NNU5132 PFC3W8</b>
<b>170</b>	230	180	2	2	215	3	995	2832	750	900	22	<b>3NN5234 VC3</b>
<b>180</b>	260	168	2,1	2,1	202	4	1105	2563	1700	2000	29,5	<b>4NNU5136 PFC3W8</b>
	260	168	2,1	2,1	202	4	1105	2563	1700	2000	29,75	<b>4NNU5136 PMC3W8</b>
<b>190</b>	260	101	2	2	240,5	2	771	1924	750	900	16,2	<b>3NN5138 VW33C3</b>
	270	200	2,1	2,1	212	4	1330	3296	1600	2000	36,3	<b>4NNU5138 PMW8</b>
<b>200</b>	280	152	2,1	2,1	259,2	5	1190	3015	700	850	32,5	<b>4NN5240 VW33C3</b>
	280	152	2,1	2,1	259,2	6	1190	3015	700	850	32,5	<b>4NNP5240 VW33C3</b>
	290	192	2,1	2,1	226	4	1205	2761	1500	1800	44,0	<b>4NNU5140 PFC3W8</b>
<b>230</b>	330	206	2,1	2,1	260	4	1625	4014	1300	1600	63,0	<b>4NNU5146 PFC3W8</b>
	330	206	2,1	2,1	260	4	1625	4014	1300	1600	63,0	<b>4NNU5146 PMC4</b>
<b>260</b>	370	220	3	3	292	4	2018	5241	300	500	77,8	<b>4NNU5152 M</b>

## Cylindrical roller bearings without inner ring

Non-standardized

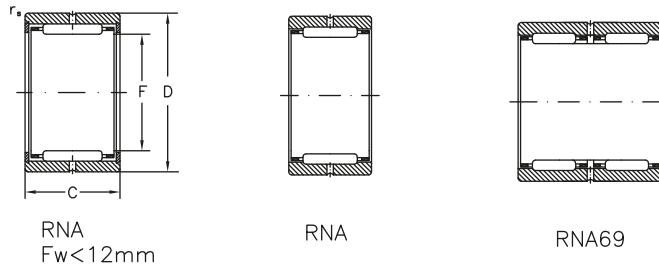


d	D	B	Dimensions		Fig.	Basical radial load dyn.	Speed limit	Mass	Designation	
			$r_s$	$r_{1s}$ min		stat. $C_r$				
mm										
						kN				
<b>19,05</b>	31,8	25,4	0,3		2	28	34	11000	18000, 0,079	
	52	15	0,7	25	3	28,6	23,9	7000	14000, 0,212	
<b>22</b>	22,5	1	0,3	38,75	7	34	35	3000	6000, 0,107	
<b>25</b>	37	30	0,3		2	36	51	9500	16000, 0,098	
	41,275	31,8	0,6	28	1	48	92	2300	5600, 0,165	
<b>28,58</b>	41,28	31,75	0,3		2	44	67	8000	1300, 0,134	
<b>30</b>	26	0,6	60	4	77,4	84,1	5000	10000, 0,361	RNN5506 M	
<b>40</b>	35,5	2,5	0,5	62	7	101	136	1700	3400, 0,334	
<b>50</b>	40	2,5	1	75,25	7	134	204	2900	3600, 0,620	
	100	21	1	66,92	1	70,4	82,6	3500	7000, 0,554	
	100	33,33	1,5	66,95	1	99,2	129	3500	7000, 0,912	
	100	33,33	1	66,95	3	99,2	129	3500	7000, 0,818	
<b>60</b>	28,53	2	0,3	127	5	177	182	2400	4800, 1,86	
	102	61	1,5	60	1	234	356	2300	2900, 2,189	
	120	38,1	1	80,48	3	140	187	2600	5300, 1,32	
	120	38,1	1	80,48	1	140	187	2600	5300, 1,53	
	140	44,45	2	95,36	1	136	259	2400	4500, 2,25	
	170	55,56	2	113,6	1	327	453	1900	3800, 4,51	
	215	76,2	2	145,23	1	569	878	1500	3000, 9,66	
	317,55	220	1	228,6	6	1655	4043	1000	2000, 56,0	
<b>R2NUN4246 MW7</b>										

## Needle roller bearings

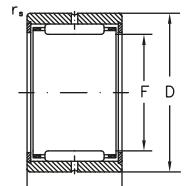


### Needle roller bearings without inner ring



Dimensions				Basic radial load		Speed limit		Designation		Mass
$F_w$	D	C	$r_s$ min.	dyn.	stat. $C_r$	grease $C_{or}$	oil	-		
mm				kN		$\text{min}^{-1}$				Kg
<b>8</b>	15	12	0,3	3,7	3,95	19000	32000	<b>RNA081512</b>	0,008	
	15	16	0,3	4,95	5,65	19000	32000	<b>RNA081516</b>		0,012
<b>9</b>	16	12	0,3	4,3	4,8	18000	30000	<b>RNA091612</b>	0,010	
	16	16	0,3	5,6	6,9	18000	30000	<b>RNA091616</b>		0,013
<b>10</b>	17	12	0,3	4,5	5,35	17000	28000	<b>RNA101712</b>	0,011	
	17	16	0,3	5,8	6,5	17000	28000	<b>RNA101716</b>		0,014
<b>12</b>	18	15	0,3	5,6	7,75	16000	26000	<b>RNA121815 TN</b>	0,012	
	19	12	0,3	4,65	5,8	16000	26000	<b>RNA121912</b>		0,013
	19	16	0,3	6,15	8,1	16000	26000	<b>RNA121916</b>		0,017
	22	12	0,3	5,3	6,65	16000	26000	<b>RNA122212</b>		0,021

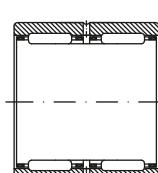
## Needle roller bearings without inner ring



RNA  
Fw<12mm



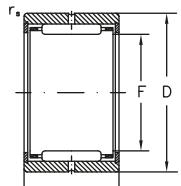
RNA



RNA69

Dimensions			Basic radial load		Speed limit		Designation		Mass
F <sub>w</sub>	D	C	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-	-	
mm			kN		min <sup>-1</sup>			Kg	
<b>14</b>	22	13	0,3	8,25	9,1	15000	24000	<b>RNA4900</b>	0,017
	22	16	0,3	9,8	11,3	15000	24000	<b>RNA142216</b>	0,021
	22	20	0,3	11,8	15,4	15000	24000	<b>RNA142220</b>	0,028
<b>16</b>	24	13	0,3	9,1	10,6	15000	24000	<b>RNA4901</b>	0,018
	24	22	0,3	14,8	20,2	15000	24000	<b>RNA6901</b>	0,032
<b>18</b>	28	15	0,3	9,5	11,9	14000	22000	<b>RNA182815</b>	0,036
<b>20</b>	28	13	0,3	10,4	13,2	13000	20000	<b>RNA4902</b>	0,022
	28	23	0,3	16,8	24,5	13000	20000	<b>RNA6902</b>	0,040
<b>22</b>	30	13	0,3	10,7	13,9	11000	18000	<b>RNA4903</b>	0,023
	30	23	0,3	18,2	27,8	11000	18000	<b>RNA6903</b>	0,043
<b>25</b>	37	17	0,3	20	24,4	9500	16000	<b>RNA4904</b>	0,053
	37	30	0,3	33	47,6	9500	16000	<b>RNA6904</b>	0,101
<b>30</b>	40	20	0,3	21	33	8000	13000	<b>RNA304020</b>	0,065
	42	17	0,3	22,2	28,3	8000	13000	<b>RNA4905</b>	0,068
	42	30	0,3	40,1	60,1	8000	13000	<b>RNA6905</b>	0,155
<b>35</b>	45	20	0,3	24,2	38,5	7000	11000	<b>RNA354520</b>	0,074
	47	17	0,3	23,7	32,1	7000	11000	<b>RNA4906</b>	0,140
	47	30	0,3	43,1	49,3	7000	11000	<b>RNA6906</b>	0,131
<b>38</b>	48	20	0,3	24,3	41,4	7000	11000	<b>RNA384820</b>	0,080
<b>42</b>	55	20	0,6	29,8	45,5	6300	9500	<b>RNA4907</b>	0,109
	55	36	0,6	52,7	95	6300	9500	<b>RNA6907</b>	0,214
<b>45</b>	55	30	0,3	40,2	86,9	6000	9000	<b>RNA455530</b>	0,137
<b>48</b>	62	22	0,6	38,7	60,9	5600	8500	<b>RNA4908</b>	0,147
	62	40	0,6	63,8	116	5600	8500	<b>RNA6908</b>	0,266
<b>50</b>	62	22	1	35,5	60,3	5300	8000	<b>RNA506222</b>	0,153
	62	25	0,6	36,3	76	5300	8000	<b>RNA506225</b>	0,157
	62	35	0,6	49,4	114	5300	8000	<b>RNA506235</b>	0,209
<b>52</b>	68	22	0,6	46,4	73,9	5000	7500	<b>RNA4909</b>	0,197
	68	40	0,6	64,5	123	5000	7500	<b>RNA6909</b>	0,283
<b>55</b>	68	25	0,6	38,5	82,2	5000	7500	<b>RNA556825 TN</b>	0,181
<b>58</b>	72	22	0,6	45	73,5	4800	7000	<b>RNA4910</b>	0,167
	72	40	0,6	67,3	136	4800	7000	<b>RNA6910</b>	0,335
<b>60</b>	72	25	0,6	40,2	87	4500	6700	<b>RNA607225 TN</b>	0,160
	72	35	0,6	55,7	130	4500	6700	<b>RNA607235</b>	0,224

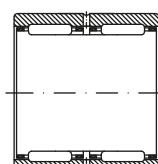
## Needle roller bearings without inner ring



RNA  
Fw<12mm



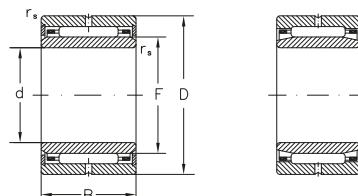
RNA



RNA69

Dimensions				Basic radial load		Speed limit		Designation		Mass
F <sub>w</sub>	D	C	r <sub>s</sub> min.	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	-		
mm				kN		min <sup>-1</sup>		-	Kg	
<b>63</b>	80	25	0,6	59,3	101	4500	6700	<b>RNA4911</b>	0,278	
	80	45	0,6	83,8	173	4500	6700	<b>RNA6911</b>	0,477	
<b>68</b>	85	25	1	62	109	4000	6000	<b>RNA4912</b>	0,296	
	85	45	1	89,1	175	4000	6000	<b>RNA6912</b>	0,493	
<b>72</b>	90	25	1	58,3	110	3800	5600	<b>RNA4913</b>	0,318	
	90	45	1	91,3	193	3800	5600	<b>RNA6913</b>	0,545	
<b>80</b>	95	25	1	53,4	115	3400	5000	<b>RNA809525</b>	0,312	
	100	30	1	76,5	148	3400	5000	<b>RNA4914 TN</b>	0,485	
	100	54	1	125	254	3400	5000	<b>RNA6914</b>	0,545	
<b>85</b>	105	30	1	80,6	158	3200	4800	<b>RNA4915</b>	0,504	
	105	54	1	127	270	3200	4800	<b>RNA6915</b>	0,965	
<b>90</b>	110	30	1	84,9	169	3000	4500	<b>RNA4916</b>	0,520	
	110	54	1	144	316	3000	4500	<b>RNA6916</b>	0,973	
<b>95</b>	115	26	1	74,3	137	2800	4300	<b>RNA95/26</b>	0,523	
<b>100</b>	120	35	1,1	98,8	222	2600	4000	<b>RNA4917</b>	0,672	
	120	63	1,1	143	378	2600	4000	<b>RNA6917</b>	1,24	
<b>105</b>	125	35	1,1	110	222	2400	3800	<b>RNA4918</b>	0,712	
	125	63	1,1	144	400	2400	3800	<b>RNA6918</b>	1,36	
<b>110</b>	130	30	1,1	99,6	210	2200	3600	<b>RNA110/30</b>	0,629	
	130	35	1,1	105	244	2200	3600	<b>RNA4919</b>	0,729	
	130	63	1,1	149	411	2200	3600	<b>RNA6919</b>	1,48	
<b>115</b>	140	40	1,1	124	267	2200	3600	<b>RNA4920</b>	1,17	
<b>120</b>	140	30	1	102	222	2000	3400	<b>RNA4822</b>	0,729	
<b>125</b>	150	40	1,1	127	283	2000	3400	<b>RNA4922</b>	1,25	
<b>130</b>	150	30	1	86,8	228	1800	3000	<b>RNA4824</b>	0,730	
<b>135</b>	165	45	1,1	170	385	1800	3000	<b>RNA4924</b>	1,93	
<b>145</b>	165	35	1,1	122	316	1700	2800	<b>RNA4826</b>	1,02	
<b>150</b>	180	50	1,5	188	421	1700	2800	<b>RNA4926</b>	2,25	
<b>155</b>	175	35	1,1	128	323	1600	2600	<b>RNA4828</b>	1,21	
	180	32	1,5	116	258	1600	2600	<b>RNA155/32</b>	1,22	
<b>160</b>	190	50	1,5	190	484	1600	2600	<b>RNA4928</b>	2,50	
<b>165</b>	190	40	1,1	150	386	1500	2400	<b>RNA4830</b>	1,68	

## Needle roller bearings



NA  
d<9 mm

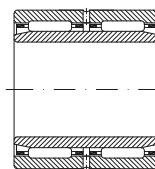
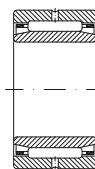
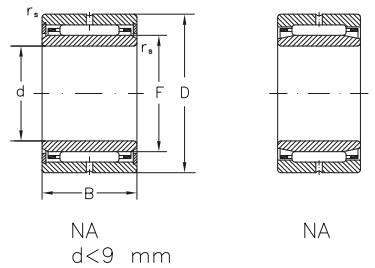
NA

NAV

NA69

Dimensions				Basic radial load		Speed limit		Designation	Mass	
d	D	B	$r_s$ min.	$F_w$	dyn. $C_r$	stat. $C_{0r}$	grease	oil		
mm				kN		min <sup>-1</sup>		-	Kg	
<b>5</b>	15	12	0,3	8	3,7	3,95	19000	32000	<b>NA051512</b>	0,013
	15	16	0,3	8	4,95	5,65	19000	32000	<b>NA051516</b>	0,016
<b>6</b>	16	12	0,3	9	4,3	4,8	18000	30000	<b>NA061612</b>	0,014
	16	16	0,3	9	5,6	6,9	18000	30000	<b>NA061616</b>	0,018
<b>7</b>	17	12	0,3	10	4,5	5,35	17000	28000	<b>NA071712</b>	0,015
	17	16	0,3	10	5,8	6,5	17000	28000	<b>NA071716</b>	0,020
<b>9</b>	19	12	0,3	12	4,65	5,8	16000	26000	<b>NA091912</b>	0,018
	19	16	0,3	12	6,15	8,1	16000	26000	<b>NA091916</b>	0,023
<b>10</b>	22	13	0,3	14	8,25	9,1	15000	24000	<b>NA4900</b>	0,024
	22	16	0,3	14	9,8	11,3	15000	24000	<b>NA102216</b>	0,031
	22	20	0,3	14	11,8	15,4	15000	24000	<b>NA102220</b>	0,038
<b>12</b>	24	13	0,3	16	9,1	10,6	15000	24000	<b>NA4901</b>	0,027
	24	22	0,3	16	14,8	20,2	15000	24000	<b>NA6901</b>	0,048
<b>15</b>	28	13	0,3	20	10,4	13,2	13000	20000	<b>NA4902</b>	0,035
	28	23	0,3	20	16,8	24,5	13000	20000	<b>NA6902</b>	0,065
<b>17</b>	30	13	0,3	22	10,7	13,9	11000	18000	<b>NA4903</b>	0,039
	30	23	0,3	22	18,2	27,8	11000	18000	<b>NA6903</b>	0,074
<b>20</b>	37	17	0,3	25	20,6	24,4	9500	16000	<b>NA4904</b>	0,077
	37	30	0,3	25	33	47,6	9500	16000	<b>NA6904</b>	0,143
<b>25</b>	42	17	0,3	30	22,2	28,3	8000	13000	<b>NA4905</b>	0,096
	42	17	0,3	30	30	42,8	3000	6000	<b>NA4905 V</b>	0,100
	42	30	0,3	30	40,1	60,1	8000	13000	<b>NA6905</b>	0,170
<b>30</b>	45	20	0,3	35	24,2	38,5	7000	11000	<b>NA304520</b>	0,117
	47	17	0,3	35	23,7	32,1	7000	11000	<b>NA4906</b>	0,107
	47	30	0,3	35	43,1	69,3	7000	11000	<b>NA6906</b>	0,202
<b>35</b>	55	20	0,6	42	29,8	45,5	6300	9500	<b>NA4907</b>	0,174
	55	36	0,6	42	52,7	95	6300	9500	<b>NA6907</b>	0,330
<b>40</b>	55	30	0,3	45	40,2	86,9	6000	9000	<b>NA405530</b>	0,221
	62	22	0,6	48	38,7	60,9	5600	8500	<b>NA4908</b>	0,239
	62	22	0,6	48	55	97,1	2000	4000	<b>NA4908 V</b>	0,266
	62	40	0,6	48	63,8	116	5600	8500	<b>NA6908</b>	0,450
	65	22	1	50	40,7	66,9	5600	8500	<b>NA406522</b>	0,290
<b>45</b>	62	25	0,6	50	36,3	76	5300	8000	<b>NA456225</b>	0,235
	62	35	0,6	50	49,4	114	5300	8000	<b>NA456235</b>	0,330
	62	22	0,6	52	46,4	73,9	5000	7500	<b>NA4909</b>	0,285
	68	40	0,6	52	64,5	123	5000	7500	<b>NA6909</b>	0,515
<b>50</b>	68	25	0,6	55	38,5	82,2	5000	7500	<b>NA506825 TN</b>	0,268
	72	22	0,6	58	45	73,5	4800	7000	<b>NA4910</b>	0,280
	72	40	0,6	58	67,3	136	4800	7000	<b>NA6910</b>	0,545

## Needle roller bearings



Dimensions				Basic radial load		Speed limit		Designation	Mass
d	D	B	r <sub>s</sub> min.	F <sub>w</sub>	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease	oil	
mm				kN		min <sup>-1</sup>		-	Kg
<b>55</b>	72	25	0,6	60	40,2	87	4500	6700	<b>NA557225 TN</b> 0,283
	72	35	0,6	60	55,7	130	4500	6700	<b>NA557235</b> 0,380
	80	25	1	63	59,3	101	4500	6700	<b>NA4911</b> 0,423
	80	25	1	63	80,3	151	1500	3000	<b>NA4911 V</b> 0,448
	80	45	1	63	83,3	173	4500	6700	<b>NA6911</b> 0,795
<b>60</b>	85	25	1	68	62	109	4000	6000	<b>NA4912</b> 0,454
	85	25	1	68	83,4	163	1400	2800	<b>NA4912 V</b> 0,480
	85	45	1	68	89,1	175	4000	6000	<b>NA6912</b> 0,836
<b>65</b>	90	25	1	72	58,3	110	3800	5600	<b>NA4913</b> 0,472
	90	45	1	72	91,3	193	3800	5600	<b>NA6913</b> 0,881
<b>70</b>	95	25	1	80	53,4	115	3400	5000	<b>NA709525</b> 0,538
	100	30	1	80	76,5	148	3400	5000	<b>NA4914 TN</b> 0,725
	100	30	1	80	103	231	1200	2700	<b>NA4914 V</b> 0,774
	100	54	1	80	125	254	3400	5000	<b>NA6914</b> 1,39
<b>75</b>	105	30	1	85	80,6	80,6	3200	4800	<b>NA4915</b> 0,796
	105	54	1	85	127	127	3200	4800	<b>NA6915</b> 1,51
<b>80</b>	110	30	1	90	84,9	84,9	3000	4500	<b>NA4916</b> 0,870
	110	54	1	90	144	144	3000	4500	<b>NA6916</b> 1,48
<b>85</b>	115	26	1	95	74,3	74,3	2800	4300	<b>NA85/26</b> 0,830
	120	35	1,1	100	98,8	98,8	2600	4000	<b>NA4917</b> 1,28
	120	63	1,1	100	143	143	2600	4000	<b>NA6917</b> 2,33
	130	45	1,1	104	121	121	900	1800	<b>NA4617 V</b> 2,57
<b>90</b>	125	35	1,1	105	110	110	2400	3800	<b>NA4918</b> 1,34
	125	63	1,1	105	144	144	2400	3800	<b>NA6918</b> 2,47
<b>95</b>	130	35	1,1	110	105	105	2200	3600	<b>NA4919</b> 1,39
	130	63	1,1	110	149	149	2200	3600	<b>NA6919</b> 2,63
<b>100</b>	130	30	1,1	110	99,6	99,6	2200	3600	<b>NA100/30</b> 1,00
	140	40	1,1	115	174	124	2200	3600	<b>NA4920</b> 1,93
<b>110</b>	140	30	1	120	102	102	2000	3400	<b>NA4822</b> 1,15
	150	40	1,1	125	127	127	2000	3400	<b>NA4922</b> 2,09
<b>120</b>	150	30	1	130	86,8	86,8	1800	3000	<b>NA4824</b> 1,23
	165	45	1,1	135	170	170	1800	3000	<b>NA4924</b> 2,95
<b>130</b>	165	35	1,1	145	122	122	1700	2800	<b>NA4826</b> 1,90
	180	50	1,5	150	188	188	1700	2800	<b>NA4926</b> 3,98
<b>140</b>	175	35	1,1	155	128	128	1600	2600	<b>NA4828</b> 1,99
	180	32	1,5	155	116	116	1600	2600	<b>NA140/32</b> 2,05
	190	50	1,5	160	190	190	1600	2600	<b>NA4928</b> 4,32
<b>150</b>	190	40	1,1	165	150	150	1500	2400	<b>NA4830</b> 2,85



# Tapered roller bearings

Tapered roller bearings have the rolling elements under the form of frusta of cones. They roll on tapered surfaces which, if extended, converge towards a single point on the bearing axis.

The rollers are guided tangentially by the cage and axially by the big rib of the outer ring, on which they have point contact. As between roller

and raceways there is linear contact, tapered roller bearings can take heavy radial loads. They can also take heavy axial or combined loads, depending on the contact angle caused by the tapered rolling elements. The contact angle is the angle of the outer raceway generatrix.

Tapered roller bearings can be manufactured in the versions: single, double and four row rollers.

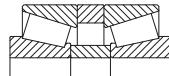
## Basic types and constructive versions:

- single row

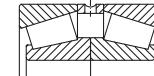


R

- paired

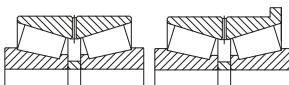


DB

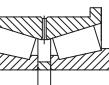


DF

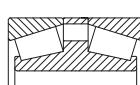
- double row



DB



DBR



DF

## Suffixes

<b>A</b>	- increased basic load
<b>A...</b>	- axial clearance of bearing set
<b>B</b>	- enlarged contact angle
<b>DB</b>	- set of two bearings mounted in back-to-back arrangement (O)
<b>DF</b>	- set of two bearings mounted in face-to-face arrangement (X)
<b>DF</b>	- bearings with double row of rollers in face-to-face arrangement (X)
<b>F</b>	- machined cage of hardened steel or special cast iron
<b>F2</b>	- constructive modifications
<b>J</b>	- pressed cage of not hardened steel sheet
<b>K</b>	- tapered bore 1:12

<b>M</b>	- machined brass cage
<b>P6X</b>	- tolerance class with smaller values than normal
<b>P5</b>	- tolerance class with smaller values than P6X
<b>P4</b>	- tolerance class with smaller values than P5
<b>P2</b>	- tolerance class with smaller values than P4
<b>R</b>	- rib on the outer ring
<b>S0</b>	- operating temperature up to +150°C
<b>S1</b>	- operating temperature up to +200°C
<b>T...</b>	- bearing set width
<b>TN</b>	- polyamide cage
<b>X</b>	- modified main dimensions according to ISO

## Single row tapered roller bearings

Single row tapered roller bearings are of separable design, i.e. the outer ring and the inner ring with rollers and cage assembly can be separately mounted. These two assemblies are interchangeable.

Tapered roller bearings can be manufactured both in standardized constructive versions with dimensions series 320, 302, 322, 303, 323, 313 and with non-standardized dimensions, mm or inch.

Tapered roller bearings can carry only single direction axial loads. Under pure radial loads, an axial force occurs which is supposed to distance the bearing ring in axial direction. Therefore, tapered roller bearings are generally pair mounted on both ends of the shaft, in "X" or "O" arrangements, so that the shaft will be axially located in both directions (table 4). Thus, the optimum clearance in these two bearings can be adjusted.

Single row tapered roller bearings can also be manufactured with rib on the outer ring. This design is to be used when the housing cannot be manufactured with shoulder, but only with a passed through bore. In this case, axial location can be provided by the bearing ring.

## Paired single row tapered roller bearing

If tapered roller bearings are pair mounted in "X" or "O" arrangements, the load carrying capacity increases and loads can be taken in both directions in the same bearing.

These bearing sets have guaranteed clearance after mounting since the distance rings are mounted between the bearing rings.

For certain application, paired bearings can be delivered with small clearance or lightly preloaded.

## Double row tapered roller bearings

Double row tapered roller bearings are used where load carrying capacity should be greater, loads should be taken in both directions and axial space is smaller than in case of a set of two single row tapered roller bearings.

Double row tapered roller bearings can have the rollers in face-to-face arrangement, i.e. double outer ring and two inner rings.

The first design provides greater stiffness, can take tilting moments and shaft expansions can be compensated.

The bearings of the second design can be

manufactured with tapered bore so that they can be frequently mounted / dismounted.

Double row tapered roller bearings can have or not distance rings with lubrication holes, mounted between the simple rings.

In case of bearings with distance rings, the bearing clearance or preload are pre-adjusted; in case of those without distance rings, bearing clearance and preload can and should be adjusted while mounting.

Double row tapered roller bearings with rollers in back-to-back arrangement can also be manufactured in the following two versions:

- with rib on the outer ring; the housing has no shoulder and the bearing is axially located by the rib;

- with two seals; this design is used in motor vehicles construction. The bearings are delivered filled with grease and relubrication is not needed.

### Dimensions

Tapered roller bearings are manufactured with the following dimension:

- metric dimension (mm), according to ISO 355;

- inch dimensions

### Misalignment

As between rollers and raceway there is a linear contact, tapeed roller bearings have low capacity to compensate for errors, of alignment between shaft and housing.

Permissible values of misalignment between shaft and housing are given in table 1, depending on bearing size and load magnitude.

Permissible misalignment		
Bearings series	Load magnitude	Permissible misalignment
329, 320, 302, 322, 303, 313	$F_r/C_{0r} < 0,1$ $F_r/C_{0r} > 0,1$	2' 4'
323, 34	$F_r/C_{0r} < 0,1$ $F_r/C_{0r} > 0,1$	1'30" 3'
35, 36 seturi DB, DF	$F_r/C_{0r} < 0,1$ $F_r/C_{0r} > 0,1$	1' 2'

## Tolerances

Tapered roller bearings are generally manufactured to the normal tolerance class ISO and AFBMA, respectively (for bearings with inch dimensions).

For certain applications (e.g. bearings for machine-tools), they can be also manufactured to tolerance classes P5 and P6X or 3 AFBMA.

At request, they can be manufactured to tolerance class P4.

Single row tapered roller bearings have the outer rings interchangeable with the inner ring - rollers - cage assembly (if they have the same mark) and also with bearings produced by other companies, according to ISO and AFBMA respectively.

The parts of the two and four row tapered roller bearings are non-interchangeable.

The tolerances for bearings overall dimensions are given in tables on the page 34 for tapered roller bearings, both with metric and inch dimensions. Tolerances for mounting chamfer are given in tables on page 43.

## Radial and axial clearance

In case of tapered roller bearings, clearance should be in radial direction, but it is measured and adjusted in axial direction. As tapered roller bearings are dismountable, their clearance is not guaranteed by design and it is adjusted while mounting. Thus, optimum clearance can be obtained for that application.

In case of double and four row tapered roller bearings with distance rings between bearing rings, the clearance is guaranteed and its values are given in table 2. The bearing parts are numbered for each bearing so that the prescribed clearance on each row should be observed while mounting.

In case of bearings without distance rings, clearance is adjusted as for single row tapered roller bearings: for DB design - by the inner rings and for DF design by the outer rings. The above specifications are also available for bearings matched in sets.

The values of the axial clearance can be calculated using the equation:

$$\text{axial clearance} = \frac{\text{radial clearance}}{2 \operatorname{tg} \alpha}$$

where  $\alpha$  is the contact angle.

In case of certain applications where clearance between shaft and housing should be avoided, tapered roller bearings can also be pre-tightened. This can be adjusted while mounting or is pre-adjusted by distance rings, in case of two or four row tapered roller bearings.

Contact angle of tapered roller bearings is the angle of the outer ring raceway generatrix. In case of standardized single row tapered roller bearings, this angle can be found in the standard of dimension ISO 355.

Bearing series 329, 302, 322, 303 and 323 have a contact angle 10° and 17° and those of series 313 have a contact angle of 28° 48' 39", so that they can take heavier axial loads.

Non-standardized single row tapered roller bearings and also all double and four-row tapered roller bearings have the contact angle between 90° and 30°.

Radial clearance of double tapered roller bearings

Table 2

Bore diameter d over up to	Radial clearance symbol									
	C1 min.	C2 max.	Normal min.	Normal max.	C3 min.	C3 max.	C4 min.	C4 max.	C5 min.	C5 max.
<hr/>										
mm	μm									
50	65	0	15	15	30	30	50	70	70	90
65	80	0	20	20	40	40	60	80	80	110
80	100	0	20	20	45	45	70	100	100	130
100	120	0	25	25	50	50	80	80	110	150
120	140	0	30	30	60	60	90	90	120	170
140	160	0	30	30	65	65	100	100	140	190
160	180	0	35	35	70	70	110	110	150	200
180	200	0	40	40	80	80	120	120	170	230
200	225	0	40	40	90	90	140	140	190	260
225	250	0	50	50	100	100	150	150	210	290
250	280	0	50	50	110	110	170	170	230	320
280	315	0	60	60	120	120	180	180	250	350
315	355	0	70	70	140	140	210	210	280	390
355	400	0	70	70	150	150	230	230	310	440
400	450	0	80	80	170	170	260	260	350	490
450	500	0	90	90	190	190	290	290	390	540
500	560	0	100	100	210	210	320	320	430	590
560	630	0	110	110	230	230	350	350	480	660
630	710	0	130	130	260	260	400	400	540	740
710	800	0	140	140	290	290	450	450	610	830
800	900	0	160	160	330	330	500	500	670	920
										1240

## Cages

Small and medium-sized tapered roller bearings are generally fitted with pressed sheet cages. Large sized bearings are generally fitted with machined steel or brass cages, with welded pins. In some cases, median or large sized bearings can also be fitted with machined steel or brass cages. In all cases, the cage is guided on rollers.

For small and medium sized bearings, glass fibre reinforced polyamide 6.6 cages can be successfully used if the operating temperature doesn't exceed +120°C. They have low mass, are noiseless in operation and have low coefficient of friction.

Design and some technical data are given in table 3.

## Equivalent dynamic radial load

Equivalent dynamic radial load can be calculated using the following equations:

- for single row tapered roller bearings:

$$P_r = F_r \text{ kN, when } F_a/F_r \leq e \\ P_r = 0,4 F_r + YF_a \text{ kN, when } F_a/F_r > e$$

For single row tapered roller bearings, the  $F_a$  values can be calculated using the equations in table 4. These equations are available when bearings are mounted so that axial clearance is in fact zero without preloading.  $F_{rA}$  and  $F_{rB}$  should always be considered as being positive, even if they act in the opposite direction to that in the figure.

In case of paired bearings and of double or four row tapered roller bearings,  $F_a$  and  $F_r$  are the loads acting upon the paired bearings or single bearings.

The values of  $e$ ,  $Y$ ,  $Y_1$  and  $Y_2$  are given in bearing tables.

## Equivalent static radial load

Equivalent static radial load can be calculated using the equations:

- for single row tapered roller bearings:

$$P_{or} = F_r \text{ kN, when } F_a/F_r \leq 1/2 Y_0 \\ P_{or} = 0,5 F_r + Y_0 F_a \text{ kN, when } F_a/F_r > 1/2 Y_0$$

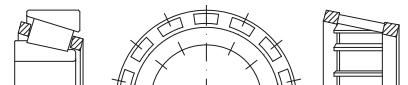
- for paired double or four row tapered roller bearings:

$$P_{or} = F_r + Y_0 F_a \text{ kN}$$

$F_a$  is calculated as in case of equivalent dynamic radial load. The values of  $Y_0$  are given in bearing tables.

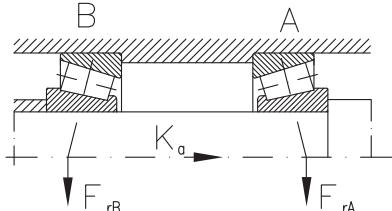
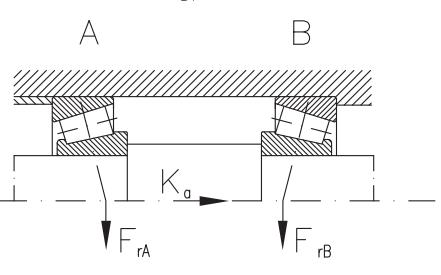
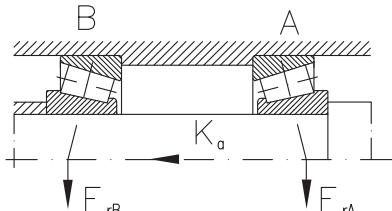
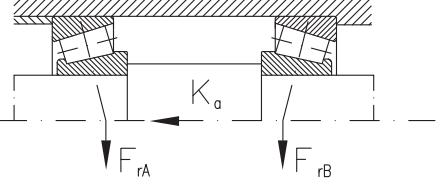
## Abutment dimensions

The mounting dimensions of tapered roller bearings are given in the bearings tables, for single row tapered roller bearings. These dimensions are also available for bearings with ribs and for standardized paired bearings. These dimensions are also available for bearings with ribs and for standardized paired bearings. For the other types of tapered roller bearings, the mounting dimensions should be adapted depending on the cross section size and mounting chamfer.

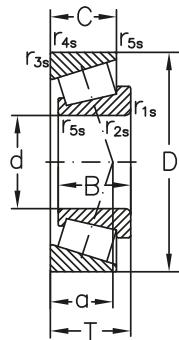
Cage design and some technical data					Table 3
Cage	Design bearing	Cage	Application	Max. value $D_m n$	
Pressed sheet cage			- General application - Small and medium sized bearings $d \leq 250 \text{ mm}$	$350 \times 10^3$	$245 \times 10^3$
Machined brass cage M			- General application - Median and large sized bearings $d > 150 \text{ mm}$	$450 \times 10^3$	$315 \times 10^3$

### Calculating relations for axial loadings $F_a$

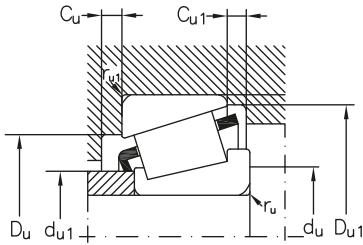
Table 4

Back to back DB	Face to face DF	Loading versions	Axial load
		1a) $\frac{F_{rA}}{Y_A} \geq \frac{F_{rB}}{Y_B}$ $F_{aA} = \frac{0,5F_{rA}}{Y_A}$ $K_a \geq 0$ $F_{aB} = F_{aA} + K_a$	
		1b) $\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B}$ $F_{aA} = \frac{0,5F_{rA}}{Y_A}$ $K_a \geq 0,5 \left( \frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A} \right)$ $F_{aB} = F_{aA} + K_a$	
		1c) $\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B}$ $F_{aA} = F_{aB} - K_a$ $K_a < 0,5 \left( \frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A} \right)$ $F_{aB} = \frac{0,5F_{rB}}{Y_B}$	
		2a) $\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $F_{aA} = F_{aB} + K_a$ $K_a \geq 0$ $F_{aB} = \frac{0,5F_{rB}}{Y_B}$	
		2b) $\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$ $F_{aA} = F_{aB} + K_a$ $K_a \geq 0,5 \left( \frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B} \right)$ $F_{aB} = \frac{0,5F_{rB}}{Y_B}$	
		2c) $\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$ $F_{aA} = \frac{0,5F_{rA}}{Y_A}$ $K_a < 0,5 \left( \frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B} \right)$ $F_{aB} = F_{aA} - K_a$	

## Tapered roller bearings, single row

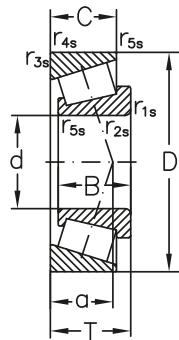


Dimensions								Designation	ISO series	Basic radial load. Factors					
d	D	B	C	T	$r_{1s,2s}$ min.	$r_{3s,4s}$ min.	$r_5$ min.	a		dyn. Cr	e	Y	stat	$Y_0$ $C_{0r}$	
mm															
<b>15</b>	42	13	11	14,25	1	1	0,3	9	<b>30302 A</b>	2FB	21,5	0,28	2,1	19,8	1,1
<b>17</b>	40	12	11	13,25	1	1	0,3	10	<b>30203 A</b>	2DB	18,3	0,35	1,7	190,9	
	47	14	12	15,25	1	1	0,3	10	<b>30303 A</b>	2FB	26	0,28	2,1	24,5	1,1
	47	19	16	20,25	1	1	0,3	12	<b>32303 A</b>	2FD	34	0,28	2,1	35,5	1,1
<b>20</b>	42	15	12	15	0,6	0,6	0,3	10	<b>32004 XA</b>	3CC	26	0,37	1,6	28,5	0,9
	47	14	12	15,25	1	1	0,3	11	<b>30204 A</b>	2DB	25,8	0,35	1,7	26,4	0,9
	52	15	13	16,25	1,5	1,5	0,6	11	<b>30304 A</b>	2FB	32	0,3	2	321,1	
	52	21	18	22,25	1,5	1,5	0,6	14	<b>32304 A</b>	2FD	42,5	0,3	2	471,1	
<b>25</b>	47	15	11,5	15	0,6	0,6	0,3	11	<b>32005 XA</b>	4CC	26	0,43	1,4	33,5	0,8
	52	15	13	16,25	1	1	0,3	12	<b>30205 A</b>	3CC	30,1	0,37	1,6	32,9	0,9
	52	18	15	19,25	1	1	0,3	16	<b>32205 A</b>	2CD	31	0,33	1,8	371	
	62	17	15	18,25	1,5	1,5	0,6	13	<b>30305 A</b>	2FB	43	0,3	2	431,1	
	62	17	13	18,25	1,5	1,5	0,6	20	<b>31305 A</b>	7FB	39	0,83	0,7	410,4	
	62	24	20	25,25	1,5	1,5	0,6	15	<b>32305 A</b>	2FD	58,3	0,3	2	60,3	1,1
<b>30</b>	55	17	13	17	1	1	0,3	13	<b>32006 XA</b>	4CC	34	0,43	1,4	45,5	0,8
	62	16	14	17,25	1	1	0,3	14	<b>30206 A</b>	3DB	40,5	0,37	1,6	45,1	0,9
	62	20	17	21,25	1	1	0,3	15	<b>32206 A</b>	3DC	49	0,37	1,6	610,9	
	72	19	16	20,75	1,5	1,5	0,6	15	<b>30306 A</b>	2FB	52,9	0,37	1,9	51,8	1,1
	72	19	14	20,75	1,5	1,5	0,6	22	<b>31306 A</b>	7FB	46,5	0,31	0,7	49,5	0,4
	72	27	23	28,75	1,5	1,5	0,6	18	<b>32306 A</b>	2FD	75,8	0,83	1,9	82,7	1,1
<b>35</b>	62	18	14	18	1	1	0,3	15	<b>32007 XA</b>	4CC	35,9	0,31	1,3	52,4	0,7
	72	17	15	18,25	1,5	1,5	0,6	15	<b>30207 A</b>	3DB	50,5	0,46	1,6	54,7	0,9
	72	23	19	24,25	1,5	1,5	0,6	17	<b>32207 A</b>	3DC	66,2	0,37	1,6	77,5	0,9
	80	21	18	22,75	2	1,5	0,6	16	<b>30307 A</b>	2FB	71,2	0,37	1,9	72,5	1,1
	80	21	15	22,75	2	1,5	0,6	25	<b>31307 A</b>	7FB	58,1	0,31	0,7	640,4	
	80	31	25	32,75	2	1,5	0,6	20	<b>32307 A</b>	2FE	95,3	0,83	1,9	106	1,1
<b>40</b>	68	19	14,5	19	1	1	0,3	15	<b>32008 XA</b>	3CD	48,8	0,31	1,6	65,6	0,9
	80	18	16	19,75	1,5	1,5	0,6	16	<b>30208 A</b>	3DB	57,9	0,37	1,6	62,4	0,9
	80	23	19	24,75	1,5	1,5	0,6	19	<b>32208 A</b>	3DC	66,2	0,37	1,6	79,5	0,9
	90	23	20	25,25	2	1,5	0,6	19	<b>30308 A</b>	2FB	83,9	0,37	1,7	91,3	0,9
	90	23	17	25,25	2	1,5	0,6	28	<b>31308 A</b>	7FB	74,6	0,83	0,7	60,8	0,4
	90	33	27	35,25	2	1,5	0,6	23	<b>32308 A</b>	2FD	105	0,35	1,7	122	0,9
<b>45</b>	75	20	15,5	20	1	1	0,3	16	<b>32009 XA</b>	3CC	57	0,4	1,5	82,2	0,8
	85	19	16	20,75	1,5	1,5	0,6	18	<b>30209 A</b>	3DB	60,1	0,4	1,5	67,1	0,8
	85	23	19	24,75	1,5	1,5	0,6	20	<b>32209 A</b>	3DC	76,5	0,4	1,5	91,6	0,8
	100	25	22	27,25	2	1,5	0,6	21	<b>30309 A</b>	2FB	106	0,35	1,7	118	0,9
	100	25	18	27,25	2	1,5	0,6	31	<b>31309 A</b>	7FB	88,9	0,83	0,7	97,1	0,4
	100	36	30	38,25	2	1,5	0,6	25	<b>32309 A</b>	2FD	133	0,35	1,7	159	0,9
<b>50</b>	80	20	15,5	20	1	1	0,3	18	<b>32010 XA</b>	3CC	58,5	0,43	1,4	88,5	0,8

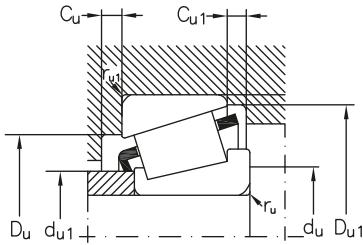


Speed limit grease min <sup>-1</sup>	Mass oil Kg	Mounting dimensions									
		d <sub>u1</sub> max.	d <sub>u</sub> min.	D <sub>u</sub> min.	D <sub>u</sub> max.	D <sub>u1</sub> min.	C <sub>u</sub> min.	C <sub>u1</sub> min.	r <sub>u</sub> max.	r <sub>u1</sub> max.	
9000	13000	0,090	22	21	36	36	38	2	3	1	1
9000	13000	0,074	23	23	34	34	37	2	2	1	1
8500	12000	0,130	25	23	40	41	42	2	3	1	1
8000	11000	0,170	24	23	39	41	43	3	4	1	1
8500	12000	0,097	25	25	36	37	39	3	3	0,6	0,6
8000	11000	0,120	27	26	40	41	43	2	3	1	1
8000	11000	0,170	28	27	44	45	47	2	3	1,5	1,5
7500	10000	0,221	27	27	43	45	47	3	4	1,5	1,5
8000	11000	0,113	30	30	40	42	44	3	3,5	0,6	0,6
7500	10000	0,150	31	31	44	46	48	2	3	1	1
7500	10000	0,182	31	31	44	46	48	3	4	1	1
6700	9000	0,250	34	32	54	55	57	2	3	1,5	1,5
5600	7500	0,255	34	32	47	55	59	3	5	1,5	1,5
6000	8000	0,360	33	32	53	55	57	3	5	1,5	1,5
6700	9000	0,017	35	36	48	49	52	3	4	1	1
6300	8500	0,220	35	36	53	56	57	2	3	1	1
6300	8500	0,280	37	36	52	56	59	3	4	1	1
5600	7500	0,380	37	37	62	65	66	3	4,5	1,5	1,5
5000	6700	0,390	40	37	55	65	68	3	6,5	1,5	1,5
5300	7000	0,550	40	37	59	65	66	4	5,5	1,5	1,5
6000	8000	0,220	39	41	54	56	59	4	4	1	1
5300	7000	0,320	40	42	62	65	67	3	3	1,5	1,5
5300	7000	0,420	44	42	61	65	67	3	5,5	1,5	1,5
5000	6700	0,520	43	44	70	71	74	3	4,5	2	1,5
4500	6000	0,520	45	44	62	71	76	4	7,5	2	1,5
4800	6300	0,730	44	44	66	71	74	4	7,5	2	1,5
5300	7000	0,270	44	46	60	62	65	4	4,5	1	1
4800	6300	0,420	46	47	69	73	74	3	3,5	1,5	1,5
4800	6300	0,510	49	47	68	73	75	3	5,5	1,5	1,5
4500	6000	0,700	48	49	77	81	82	3	5	2	1,5
4000	5300	0,685	52	49	71	81	86	4	8	2	1,5
4000	5300	0,993	51	49	73	81	82	4	8	2	1,5
4800	6300	0,330	50	51	67	69	72	4	4,5	1	1
4500	6000	0,470	51	52	74	78	80	3	4,5	1,5	1,5
4500	6000	0,560	54	52	73	78	80	3	5,5	1,5	1,5
4000	5300	0,920	53	54	86	91	92	3	5	2	1,5
3400	4500	0,915	59	54	79	91	95	4	9	2	1,5
3600	4800	1,25	56	54	82	91	93	4	8	2	1,5
4500	6000	0,360	56	56	72	74	77	4	4,5	1	1

## Tapered roller bearings, single row

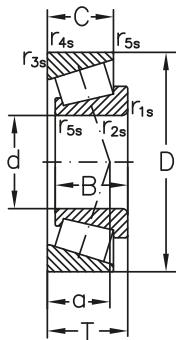


Dimensions								Designation	ISO series	Basic radial load. Factors					
d	D	B	C	T	r <sub>1s,2s</sub> min.	r <sub>3s,4s</sub> min.	r <sub>5</sub> min.	a		dyn. Cr	e	Y	stat	Y <sub>0</sub> C <sub>0r</sub>	
mm															
<b>50</b>	90	20	17	21,75	1,5	1,5	0,6	19	<b>30210 A</b>	3DB	69,7	0,43	1,4	81,3	0,8
	90	23	19	24,75	1,5	1,5	0,6	21	<b>32210 A</b>	3DC	79,1	0,43	1,4	95,8	0,8
	110	27	23	29,25	2,5	2	0,6	23	<b>30310 A</b>	2FB	120	0,35	1,7	133	0,9
	110	27	19	29,25	2,5	2	0,6	34	<b>31310 A</b>	7FB	102	0,83	0,7	112	0,4
	110	40	33	42,25	2,5	2	0,6	27	<b>32310 A</b>	2FD	160	0,35	1,7	194	0,9
<b>55</b>	90	23	17,5	23	1,5	1,5	0,6	20	<b>32011 XA</b>	3CC	77	0,4	1,5	117	0,8
	100	21	18	22,75	2	1,5	0,6	20	<b>30211 A</b>	3DB	83	0,4	1,5	95,2	0,8
	100	25	21	26,75	2	1,5	0,6	22	<b>32211 A</b>	3DC	96,2	0,4	1,5	115	0,8
	120	29	25	31,5	2,5	2	0,6	24	<b>30311 A</b>	2FB	146	0,35	1,7	166	0,9
	120	29	21	31,5	2,5	2	0,6	37	<b>31311 A</b>	7FB	118	0,83	0,7	133	0,4
	120	43	35	45,5	2,5	2	0,6	29	<b>32311 A</b>	2FD	191	0,35	1,7	235	0,9
<b>60</b>	95	23	17,5	23	1,5	1,5	0,6	21	<b>32012 XA</b>	4CC	78,5	0,43	1,4	119	0,8
	110	22	19	23,75	2	1,5	0,6	22	<b>30212 A</b>	3EB	91,6	0,4	1,5	105	0,8
	110	28	24	29,75	2	1,5	0,6	24	<b>32212 A</b>	3EC	122	0,4	1,5	152	0,8
	130	31	26	33,5	3	2,5	1	26	<b>30312 A</b>	2FB	164	0,35	1,7	187	0,9
	130	31	22	33,5	3	2,5	1	39	<b>31312 A</b>	7FB	140	0,83	0,7	158	0,4
	130	46	37	48,5	3	2,5	1	31	<b>32312 A</b>	2FD	229	0,35	1,7	288	0,9
<b>65</b>	100	23	17,5	23	1,5	1,5	0,6	22	<b>32013 XA</b>	4CC	80,6	0,46	1,3	123	0,7
	120	23	20	24,75	2	1,5	0,6	23	<b>30213 A</b>	3EB	111	0,4	1,5	129	0,8
	120	31	27	32,75	2	1,5	0,6	27	<b>32213 A</b>	3EC	149	0,4	1,5	189	0,8
	140	33	28	36	3	2,5	1	28	<b>30313 A</b>	2GB	191	0,35	1,7	220	0,9
	140	33	23	36	3	2,5	1	42	<b>31313 A</b>	7GB	164	0,83	0,7	189	0,4
	140	48	39	51	3	2,5	1	33	<b>32313 A</b>	2GO	256	0,35	1,7	322	0,9
<b>70</b>	110	25	19	25	1,5	1,5	0,6	23	<b>32014 XA</b>	4CC	95,6	0,43	1,4	143	0,8
	125	24	21	26,25	2	1,5	0,6	25	<b>30214 A</b>	3EB	119	0,43	1,4	143	0,8
	125	31	27	33,25	2	1,5	0,6	28	<b>32214 A</b>	3EC	157	0,43	1,4	204	0,8
	150	35	30	38	3	2,5	1	29	<b>30314 A</b>	2GB	224	0,35	1,7	264	0,9
	150	35	25	38	3	2,5	1	45	<b>31314 A</b>	7GB	185	0,83	0,7	215	0,4
	150	51	42	54	3	2,5	1	36	<b>32314 A</b>	2GD	297	0,35	1,7	381	0,9
<b>75</b>	115	25	19	25	1,5	1,5	0,6	25	<b>32015 XA</b>	4CC	97,3	0,46	1,3	149	0,7
	130	25	22	27,25	2	1,5	0,6	27	<b>30215 A</b>	4DB	134	0,43	1,4	166	0,8
	130	31	27	33,25	2	1,5	0,6	29	<b>32215 A</b>	4DC	157	0,43	1,4	205	0,8
	160	37	31	40	3	2,5	1	31	<b>30315 A</b>	2GB	246	0,35	1,7	289	0,9
	160	37	26	40	3	2,5	1	48	<b>31315 A</b>	7GB	213	0,83	0,7	251	0,4
	160	55	45	58	3	2,5	1	38	<b>32315 A</b>	2GD	350	0,35	1,7	460	0,9
<b>80</b>	125	29	22	29	1,5	1,5	0,6	27	<b>32016 XA</b>	3CC	130	0,43	1,4	198	0,8
	140	26	22	28,25	2,5	2	0,6	28	<b>30216 A</b>	3EB	145	0,43	1,4	177	0,8
	140	33	28	35,25	2,5	2	0,6	30	<b>32216 A</b>	3EC	180	0,43	1,4	232	0,8
	170	39	33	42,5	3	2,5	1	33	<b>30316 A</b>	2GB	277	0,35	1,7	329	0,9
	170	39	27	42,5	3	2,5	1	52	<b>31316 A</b>	7GB	222	0,83	0,7	275	0,4

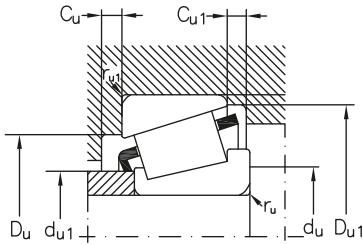


Speed limit grease      oil	Mass	Mounting dimensions									
		d_{u1} max.	d_u min.	D_u min.	D_u max.	D_{u1} min.	C_u min.	C_{u1} min.	r_u max.	r_{u1} max.	
min^{-1}	Kg										
4300	5600	0,530	58	57	79	83	85	3	4,5	1,5	1,5
4300	5600	0,600	58	57	78	83	85	3	5,5	1,5	1,5
3600	4800	1,19	65	60	95	100	102	4	6	2,5	2
3200	4300	1,16	62	60	87	100	104	4	10	2,5	2
3200	4300	1,83	62	60	90	100	102	5	9	2,5	2
4000	5300	0,540	63	62	81	83	86	4	5,5	1,5	1,5
3800	5000	0,690	64	64	88	91	94	4	4,5	1,5	1,5
3800	5000	0,820	63	64	87	91	95	4	5,5	1,5	1,5
3200	4300	1,53	71	65	104	110	111	4	6,5	2	2
2800	3800	1,49	68	65	94	110	113	4	10,5	2	2
3000	4000	2,21	68	65	99	110	111	5	10,5	2	2
3800	5000	0,580	67	67	85	88	91	4	5,5	1,5	1,5
3400	4500	0,860	70	69	96	101	103	4	4,5	2	1,5
3400	4500	1,10	69	69	95	101	104	4	5,5	2	1,5
3000	4000	1,90	77	72	112	118	120	5	7,5	3	2,5
2600	3600	1,83	73	72	103	118	123	5	11,5	3	2,5
2600	3600	2,80	74	72	107	118	120	6	11,5	3	2,5
3400	4500	0,620	72	72	90	93	97	4	5,5	1,5	1,5
3000	4000	1,10	77	74	106	111	113	4	4,5	2	1,5
3000	4000	1,48	76	74	104	111	115	4	5,5	2	1,5
2600	3600	2,30	83	77	122	128	130	5	8	3	2,5
2200	3200	2,25	79	77	111	128	132	5	13	3	2,5
2400	3400	3,49	80	77	117	128	130	6	12	3	2,5
3200	4300	0,830	78	77	98	103	105	5	6	1,5	1,5
3000	4000	1,22	81	79	110	116	118	4	5	2	1,5
2800	3800	1,56	80	79	108	116	119	4	6	2	1,5
2400	3400	3,00	89	82	130	138	140	5	8	3	2,5
2000	3000	2,82	84	82	118	138	141	5	13	3	2,5
2200	3200	4,10	86	82	125	138	140	6	12	3	2,5
3000	4000	0,880	83	82	103	108	110	5	6	1,5	1,5
2800	3800	1,33	86	84	115	121	124	4	5	2	1,5
2600	3600	2,62	85	84	115	121	124	4	6	2	1,5
2600	3600	3,40	95	87	139	148	149	5	9	3	2,5
1900	2800	3,50	91	87	127	148	151	6	14	3	2,5
2000	3000	5,00	91	87	133	148	149	7	13	3	2,5
2600	3600	1,24	89	87	112	117	120	6	7	1,5	1,5
2400	3400	1,59	91	90	124	130	132	4	6	2,5	2
2400	3400	2,00	90	90	122	130	134	5	7	2,5	2
2000	3000	4,00	102	92	148	158	159	5	9,5	3	2,5
1900	2800	4,07	97	92	134	158	159	6	15,5	3	2,5

## Tapered roller bearings, single row

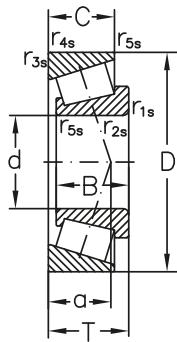


Dimensions								Designation	ISO series	Basic radial load. Factors				
d	D	B	C	T	r <sub>1s,2s</sub> min.	r <sub>3s,4s</sub> min.	r <sub>5</sub> min.	a		dyn. Cr	e	Y	stat	Y <sub>0</sub> C <sub>0r</sub>
mm														
<b>80</b>	170	58	48	61,5	3	2,5	1	41	<b>32316 A</b>	2GD	383	0,35	1,7	503 0,9
<b>85</b>	130	29	22	29	1,5	1,5	0,6	28	<b>32017 XA</b>	4CC	136	0,44	1,4	213 0,8
	150	28	24	30,5	2,5	2	0,6	30	<b>30217 A</b>	3EB	167	0,43	1,4	206 0,8
	150	36	30	38,5	2,5	2	0,6	33	<b>32217 A</b>	3EC	213	0,43	1,4	283 0,8
	180	41	34	44,5	4	3	1	35	<b>30317 A</b>	2GB	298	0,35	1,7	354 0,9
	180	41	28	44,5	4	3	1	55	<b>31317 A</b>	7GB	245	0,83	0,7	298 0,4
	180	60	49	63,5	4	3	1	42	<b>32317 A</b>	2GD	400	0,35	1,7	555 0,9
<b>90</b>	140	32	24	32	2	1,5	0,6	30	<b>32018 XA</b>	3CC	159	0,43	1,4	246 0,8
	160	30	26	32,5	2,5	2	0,6	31	<b>30218 A</b>	3FB	190	0,43	1,4	238 0,8
	160	40	34	42,5	2,5	2	0,6	36	<b>32218 A</b>	3FC	251	0,43	1,4	340 0,8
	190	43	36	46,5	4	3	1	36	<b>30318 A</b>	2GB	328	0,35	1,7	394 0,9
	190	43	30	46,5	4	3	1	57	<b>31318 A</b>	7GB	270	0,83	0,7	330 0,4
	190	64	53	67,5	4	3	1	44	<b>32318 A</b>	2GD	461	0,35	1,7	612 0,9
<b>95</b>	145	32	24	32	2	1,5	0,6	31	<b>32019 XA</b>	4CC	163	0,44	1,4	257 0,8
	170	32	27	34,5	3	2,5	1	33	<b>30219 A</b>	2FB	210	0,43	1,4	264 0,8
	170	43	37	45,5	3	2,5	1	39	<b>32219 A</b>	3FC	281	0,43	1,4	390 0,8
	200	45	38	49,5	4	3	1	39	<b>30319 A</b>	2GB	350	0,35	1,7	449 0,9
	200	45	32	49,5	4	3	1	60	<b>31319 A</b>	7GB	300	0,83	0,7	365 0,4
	200	67	55	71,5	4	3	1	47	<b>32319 A</b>	2GD	500	0,35	1,7	670 0,9
<b>100</b>	150	32	24	32	2	1,5	0,6	32	<b>32020 XA</b>	4CC	171	0,46	1,3	277 0,7
	180	34	29	37	3	2,5	1	35	<b>30220 A</b>	3FB	238	0,43	1,4	303 0,8
	180	46	39	49	3	2,5	1	41	<b>32220 A</b>	3FC	320	0,43	1,4	444 0,8
	215	47	39	51,5	4	2	1	40	<b>30320 A</b>	2GB	404	0,35	1,7	492 0,9
	215	73	60	77,5	4	3	1	53	<b>32320 A</b>	2GD	578	0,35	1,7	780 0,9
<b>105</b>	160	35	26	35	2,5	2	0,6	34	<b>32021 XA</b>	4DC	204	0,44	1,4	334 0,8
	190	36	30	39	3	2,5	1	37	<b>30221 A</b>	3FB	270	0,43	1,4	350 0,8
	190	50	43	53	3	2,5	1	44	<b>32221 A</b>	3FC	358	0,43	1,4	510 0,8
	225	77	63	81,5	4	3	1	53	<b>32321 A</b>	2GD	405	0,35	1,7	815 0,9
<b>110</b>	170	38	29	38	2,5	2	0,6	36	<b>32022 XA</b>	4DC	235	0,43	1,4	382 0,8
	200	38	32	41	3	2,5	1	39	<b>30222 A</b>	3FB	304	0,43	1,4	396 0,8
	200	53	46	56	3	2,5	1	46	<b>32222 A</b>	3FC	406	0,43	1,4	580 0,8
	240	50	42	54,5	4	3	1	43	<b>30322 A</b>	2GB	479	0,35	1,7	588 0,9
	240	80	65	84,5	4	3	1	55	<b>32322 A</b>	2GD	699	0,35	1,7	956 0,9
<b>120</b>	180	38	29	38	2,5	2	0,6	39	<b>32024 XA</b>	4DC	238	0,46	1,3	397 0,7
	215	40	34	43,5	3	2,5	1	43	<b>30224 A</b>	4FB	340	0,43	1,4	459 0,8
	215	58	50	61,5	3	2,5	1	51	<b>32224 A</b>	4FD	446	0,43	1,4	653 0,8
	260	55	46	59,5	4	3	1	47	<b>30324 A</b>	2GB	568	0,35	1,7	712 0,9
	260	86	69	90,5	4	3	1	60	<b>32324 A</b>	2GD	799	0,35	1,7	1104 0,9
<b>130</b>	200	45	34	45	2,5	2	0,6	42	<b>32026 XA</b>	4EC	315	0,43	1,4	526 0,8
	230	40	34	43,75	4	3	1	45	<b>30226 A</b>	4FB	367	0,43	1,4	485 0,8
	230	64	54	67,75	4	3	1	56	<b>32226 A</b>	4FD	551	0,43	1,4	836 0,8

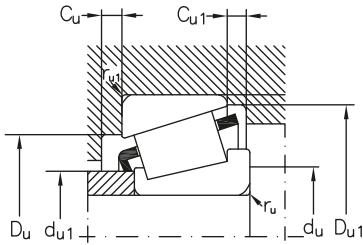


Speed limit grease      oil	Mass	Mounting dimensions									
		d <sub>u1</sub> max.	d <sub>u</sub> min.	D <sub>u</sub> min.	D <sub>u</sub> max.	D <sub>u1</sub> min.	C <sub>u</sub> min.	C <sub>u1</sub> min.	r <sub>u</sub> max.		
min <sup>-1</sup>	Kg								r <sub>u1</sub> max.		
1900	2800	5,90	98	92	142	158	159	7	13,5	3	2,5
2400	3400	1,30	94	92	117	122	125	6	7	1,5	1,5
2200	3200	2,00	97	95	132	140	141	5	6,5	2,5	2
2200	3200	2,50	96	95	130	140	142	5	8,5	2,5	2
1900	2800	4,70	107	99	156	166	167	6	10,5	4	3
1800	2600	5,08	103	99	143	166	169	6	16,5	4	3
1800	2600	6,85	103	99	150	166	167	8	14,5	4	3
2200	3200	1,70	100	99	125	131	134	6	8	2	1,5
2200	3000	2,49	103	100	140	150	150	5	6,5	2,5	2
2000	3000	3,30	102	100	138	150	152	5	8,5	2,5	2
1700	2400	5,50	113	104	165	176	176	6	10,5	4	3
1700	2400	5,92	109	104	151	176	179	6	16,5	4	3
1700	2400	8,21	108	104	157	176	177	8	14,5	4	3
2200	3200	1,80	105	104	130	136	140	6	8	2	1,5
1900	2800	2,96	110	107	149	158	159	5	7,5	3	2,5
1900	2800	4,00	108	107	145	158	161	5	8,5	3	2,5
1800	2600	6,70	118	109	172	186	184	6	11,5	4	3
1700	2400	6,95	114	109	157	186	187	6	17,5	4	3
1700	2400	11,0	115	109	166	186	186	8	16,5	4	3
2000	3000	1,85	109	109	134	141	144	6	8	2	1,5
1900	2800	3,54	116	112	157	168	168	5	8	3	2,5
1800	2600	4,76	114	112	154	168	171	5	10	3	2,5
1700	2400	7,90	127	114	184	201	197	6	12,5	4	3
1600	2200	14,0	123	114	177	201	200	8	17,5	4	3
1900	2800	2,42	116	115	143	150	154	6	9	2,5	2
1800	2600	4,26	122	117	165	178	177	6	9	3	2,5
1800	2600	5,90	120	117	161	178	180	5	10	3	2,5
1500	2000	14,5	128	119	185	211	209	9	18,5	4	3
1800	2600	3,06	122	120	152	160	163	7	9	2,5	2
1700	2400	5,00	129	122	174	188	187	6	9	3	2,5
1700	2400	6,90	126	122	170	188	190	6	10	3	2,5
1600	2200	12,5	141	124	206	226	220	8	12,5	4	3
1400	1900	16,4	137	124	198	226	222	9	19,5	4	3
1700	2400	3,25	131	130	161	170	173	7	9	2,5	2
1600	2200	6,01	140	132	187	203	201	6	9,5	3	2,5
1600	2200	8,59	136	132	181	203	204	7	11,5	3	2,5
1500	2000	13,6	152	134	221	246	237	10	13,5	4	3
1300	1800	24,5	148	134	213	246	239	9	21,5	4	3
1600	2200	4,93	144	140	178	190	192	8	11	2,5	2
1500	2000	7,60	152	144	203	216	217	7	9,5	4	3
1500	2000	10,7	146	144	193	216	219	7	13,5	4	3

## Tapered roller bearings, single row

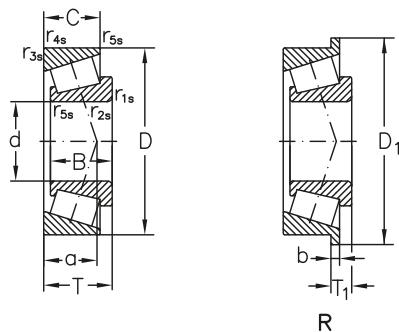


Dimensions								Designation	ISO series	Basic radial load. Factors					
d	D	B	C	T	r <sub>1s,2s</sub> min.	r <sub>3s,4s</sub> min.	r <sub>5</sub> min.	a		dyn. Cr	e	Y	stat	Y <sub>0</sub>	
mm								-	-	kN	-	kN	-		
<b>130</b>	280	58	49	63,75	5	4	1,5	51	<b>30326 A</b>	2GB	640	0,35	1,7	820	0,9
	280	66	44	72	5	4	1,5	87	<b>31326 XA</b>	7GB	597	0,83	0,7	761	0,4
	280	93	78	98,75	5	4	1,5	66	<b>32326 A</b>	-	947	0,35	1,7	1333	0,9
<b>140</b>	210	45	34	45	2,5	2	0,6	46	<b>32028 XA</b>	4DC	312	0,46	1,3	529	0,7
	250	42	36	45,75	4	3	1	47	<b>30228 A</b>	4FB	396	0,43	1,4	527	0,8
	250	68	58	71,75	4	3	1	60	<b>32228 A</b>	4FD	602	0,43	1,4	907	0,8
	300	70	47	77	5	4	1,5	90	<b>31328 XA</b>	7GB	714	0,83	0,7	935	0,4
<b>150</b>	225	48	36	48	3	2,5	1	49	<b>32030 XA</b>	4EC	355	0,46	1,3	620	0,7
	270	45	38	49	4	3	1	50	<b>30230 A</b>	4GB	457	0,43	1,4	618	0,8
	270	73	60	77	4	3	1	64	<b>32230 A</b>	4GD	705	0,43	1,4	1080	0,8
<b>160</b>	240	51	38	51	3	2,5	1	52	<b>32032 XA</b>	4EC	402	0,46	1,3	696	0,7
	290	48	40	52	4	3	1	54	<b>30232 A</b>	4GB	520	0,43	1,4	710	0,8
	290	80	67	84	4	3	1	70	<b>32232 A</b>	4GD	840	0,43	1,4	1400	0,8
<b>170</b>	230	38	30	38	2,5	2	0,6	42	<b>32934 A</b>	3DC	280	0,37	1,6	572	0,9
	260	57	43	57	3	2,5	1	56	<b>32034 XA</b>	4EC	480	0,44	1,4	865	0,8
	310	52	43	57	5	4	1,5	58	<b>30234 A</b>	4GB	610	0,43	1,4	844	0,8
	310	86	71	91	5	4	1,5	75	<b>32234 A</b>	4GD	889	0,43	1,4	1377	0,8
<b>180</b>	250	45	34	45	2,5	2	0,6	53	<b>32936 A</b>	4DC	350	0,48	1,3	727	0,7
	280	64	48	64	3	2,5	1	59	<b>32036 XA</b>	3FD	599	0,43	1,4	1037	0,8
	320	52	43	57	5	4	1,5	61	<b>30236 A</b>	4GB	584	0,46	1,3	825	0,7
	320	86	71	91	5	4	1,5	78	<b>32236 A</b>	4GD	974	0,46	1,3	1571	0,7
<b>190</b>	260	45	34	45	2,5	2	0,6	55	<b>32938 A</b>	4DC	358	0,48	1,3	772	0,7
	290	64	48	64	3	2,5	1	62	<b>32038 XA</b>	4FD	609	0,44	1,4	1077	0,8
	340	92	75	97	5	4	1,5	81	<b>32238 A</b>	4GD	1080	0,43	1,4	1860	0,8
<b>200</b>	280	51	39	51	3	2,5	1	53	<b>32940 A</b>	3EC	474	0,4	1,5	950	0,8
	310	70	53	70	3	2,5	1	66	<b>32040 XA</b>	4FD	716	0,43	1,4	1356	0,8
	310	70	53	70	3	2,5	1	66	<b>T32040 X</b>	4FD	716	0,43	1,4	1356	0,8
	310	70	53	70	3	2,5	1	66	<b>T32040 XP5</b>	4FD	716	0,43	1,4	1356	0,8
	360	98	82	104	5	4	1,5	83	<b>32240 A</b>	3GD	1220	0,4	1,5	2020	0,8
<b>220</b>	300	51	39	51	3	2,5	1	58	<b>32944 M</b>	3EC	407	0,43	1,4	827	0,8
	340	76	57	76	4	3	1	72	<b>32044 XA</b>	4FD	850	0,43	1,4	1537	0,8

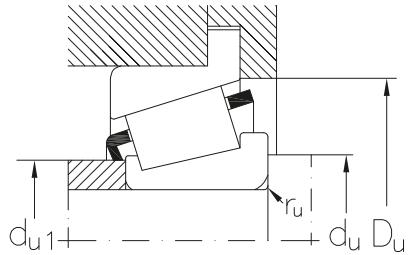


Speed limit grease min <sup>-1</sup>	Mass oil Kg	Mounting dimensions									
		d_{u1} max.	d_u min.	D_u min.	D_u max.	D_{u1} min.	C_u min.	C_{u1} min.	r_u max.	r_{u1} max.	
1300	1800	19,5	164	148	239	262	255	8	14,5	5	4
1200	1700	18,6	157	148	218	262	261	9	28	5	4
1100	1600	27,6	160	148	230	262	260	10	20,5	5	4
1600	2200	5,23	153	150	187	200	202	8	11	2,5	2
1400	1900	8,50	163	154	219	236	234	9	9,5	4	3
1400	1900	13,9	159	154	210	236	238	8	13,5	4	3
1200	1700	23,9	169	158	235	282	280	9	30	5	4
1500	2000	6,35	164	162	200	213	216	8	12	3	2,5
1300	1800	10,7	175	164	234	256	250	9	11	4	3
1200	1700	17,9	171	164	226	256	254	8	17	4	3
1300	1800	7,75	175	172	213	228	231	8	13	3	2,5
1100	1600	13,6	189	174	252	276	269	9	12	4	3
1100	1600	25,5	183	174	242	276	274	10	17	4	3
1400	1900	4,50	183	180	213	220	222	7	8	2,5	2
1200	1700	10,5	187	182	230	248	249	10	14	3	2,5
1000	1500	19,0	203	188	269	292	288	8	14	5	4
1000	1500	29,3	196	188	259	292	294	10	20	5	4
1200	1700	6,65	193	190	225	240	241	8	11	2,5	2
1100	1600	14,5	199	192	247	268	267	10	16	3	2,5
1000	1500	20,0	211	198	278	302	297	9	14	5	4
950	1400	27,4	204	198	267	302	303	10	20	5	4
1100	1600	7,00	204	200	235	249	251	8	11	2,5	2
1000	1500	15,0	209	202	257	278	279	10	16	3	2,5
900	1300	39,5	216	207	286	322	323	10	22	5	4
1000	1500	9,50	216	212	257	268	271	9	12	3	2,5
950	1400	19,5	221	212	273	298	297	11	17	3	2,5
950	1400	19,5	221	212	273	298	297	11	17	3	2,5
950	1400	19,5	221	212	273	298	297	11	17	3	2,5
900	1300	33,0	226	217	302	342	340	11	22	5	4
950	1400	11,2	234	232	275	288	290	9	12	3	2,5
900	1300	25,5	243	234	300	326	326	12	19	4	3

## Tapered roller bearings with flanged outer ring

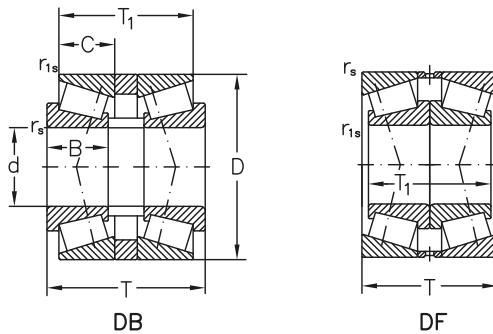


Dimensions										Designation	ISO series	
d	D	B	C	T	r <sub>1s</sub> , r <sub>2s</sub> min.	r <sub>3s</sub> , r <sub>4s</sub> min.	D <sub>1</sub>	b	a			
mm												
<b>20</b>	47	14	12	6,25	1	1	51	3	11	<b>30204 AR</b>	2DB	
<b>25</b>	52	15	13	6,25	1	1	57	3,5	12	<b>30205 AR</b>	3CC	
<b>30</b>	62	16	14	6,75	1	1	67	3,5	14	<b>30206 AR</b>	3DB	
	62	20	17	8,25	1	1	67	4	15	<b>32206 AR</b>	3DC	
	72	19	16	8,75	1,5	1,5	77	4	15	<b>30306 AR</b>	2FB	
	72	27	23	11,75	1,5	1,5	77	6	18	<b>32306 AR</b>	2FD	
<b>35</b>	72	17	15	7,25	1,5	1,5	77	4	15	<b>30207 AR</b>	3DB	
	72	23	19	10,25	1,5	1,5	77	4,5	17	<b>32207 AR</b>	3DC	
	80	21	18	8,25	2	1,5	85	4,5	16	<b>30307 AR</b>	2FB	
	80	31	25	13,75	2	1,5	85	6	20	<b>32307 AR</b>	2FE	
<b>40</b>	80	18	16	7,75	1,5	1,5	85	4	16	<b>30208 AR</b>	3DB	
	80	23	19	10,25	1,5	1,5	85	4,5	19	<b>32208 AR</b>	3DC	
	90	23	20	9,75	2	1,5	95	4,5	19	<b>30308 AR</b>	2FB	
	90	33	27	14,25	2	1,5	95	6	23	<b>32308 AR</b>	2FD	
<b>45</b>	85	19	16	8,75	1,5	1,5	90	4	18	<b>30209 AR</b>	3DB	
	85	23	19	10,25	1,5	1,5	90	4,5	20	<b>32209 AR</b>	3DC	
	100	25	22	10,25	2	1,5	106	5	21	<b>30309 AR</b>	2FB	
	100	36	30	15,25	2	1,5	106	7	25	<b>32309 AR</b>	2FD	
<b>50</b>	90	20	17	8,75	1,5	1,5	95	4	19	<b>30210 AR</b>	3DB	
	90	23	19	10,25	1,5	1,5	95	4,5	21	<b>32210 AR</b>	3DC	
	110	27	23	11,25	2,5	2	116	5	23	<b>30310 AR</b>	2FB	
	110	40	33	17,25	2,5	2	116	8	27	<b>32310 AR</b>	2FD	
<b>55</b>	100	21	18	9,25	2	1,5	106	4,5	20	<b>30211 AR</b>	3DB	
	100	25	21	10,75	2	1,5	106	5	22	<b>32211 AR</b>	3DC	
	120	43	35	18,5	2,5	2	127	8	29	<b>32311 AR</b>	2FD	
<b>60</b>	110	22	19	9,25	2	1,5	116	4,5	22	<b>30212 AR</b>	2EB	
	110	28	24	10,75	2	1,5	116	5	24	<b>32212 AR</b>	2EC	
	130	46	37	19,5	3	2,5	137	8	31	<b>32312 AR</b>	2FD	
<b>65</b>	120	23	20	9,25	2	1,5	127	4,5	23	<b>30213 AR</b>	3EB	
	120	31	27	11,75	2	1,5	127	6	27	<b>32213 AR</b>	3EC	
<b>70</b>	125	24	21	10,25	2	1,5	132	5	25	<b>30214 AR</b>	3EB	
	125	31	27	12,25	2	1,5	132	6	28	<b>32214 AR</b>	3EC	

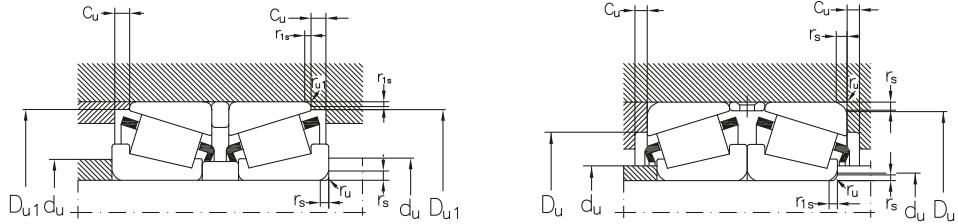


dyn. Cr	e	Y stat C <sub>0r</sub>	Basic radial load. Factors		Speed limit		Mass grease oil	Mounting dimensions			
			kN	-	kN	-		min <sup>-1</sup>	Kg	d <sub>u1</sub> max.	d <sub>u</sub> min.
26	0,35	1,7	29	0,9	8000	11000	0,127	27	26	43	1
29,5	0,37	1,6	36	0,9	7500	10000	0,161	31	31	48	1
38	0,37	1,6	48	0,9	6300	8500	0,233	37	36	57	1
47,5	0,37	1,6	65	0,9	6300	8500	0,290	37	36	59	1
53	0,31	1,9	65	1,1	5600	7500	0,398	39	37	66	1,5
72,3	0,31	1,9	97	1,1	5600	7000	0,577	40	37	66	1,5
49,4	0,37	1,6	58	0,9	5300	7000	0,338	44	42	67	1,5
61,6	0,37	1,6	80	0,9	5300	7000	0,422	43	42	67	1,5
68,2	0,31	1,9	83	1,1	5000	6700	0,543	45	44	74	2
88,2	0,31	1,9	120	1,1	4800	6300	0,760	44	44	74	2
58,5	0,37	1,6	70	0,9	4800	6300	0,440	49	47	74	1,5
71	0,37	1,6	95	0,9	4800	6300	0,533	48	47	75	1,5
81	0,35	1,7	105	0,9	4500	6000	0,725	52	49	82	2
110	0,35	1,7	156	0,9	4000	5300	1,027	50	49	82	2
63	0,4	1,5	83	0,8	4500	6000	0,491	54	52	80	1,5
75	0,4	1,5	103	0,8	4500	6000	0,584	53	52	80	1,5
101	0,35	1,7	130	0,9	4000	5300	0,958	59	54	92	2
132	0,35	1,7	188	0,9	3600	4800	1,30	56	54	93	2
70,5	0,43	1,4	95	0,8	4300	5600	0,552	58	57	85	1,5
76,5	0,43	1,4	106	0,8	4300	5600	0,625	58	57	85	1,5
120	0,35	1,7	156	0,9	3600	4800	1,23	65	60	102	2,5
165	0,35	1,7	239	0,9	3200	4300	1,89	62	60	102	2,5
84,5	0,4	1,5	112	0,8	3800	5000	0,724	64	64	94	1,5
99	0,4	1,5	138	0,8	3800	5000	0,858	63	64	95	1,5
187	0,35	1,7	276	0,9	3000	4000	2,29	68	65	111	2
91,5	0,4	1,5	122	0,8	3400	4500	0,897	70	69	103	2
120	0,4	1,5	170	0,8	3400	4500	1,14	69	69	104	2
216	0,35	1,7	318	0,9	2600	3600	1,92	74	72	120	3
110	0,4	1,5	147	0,8	3000	4000	1,14	77	74	113	2
142	0,4	1,5	206	0,8	3000	4000	1,54	76	74	115	2
120	0,43	1,4	163	0,8	3000	4000	1,27	81	79	118	2
150	0,43	1,4	220	0,8	2800	3800	1,62	80	79	119	2

## Tapered roller bearings, single row, paired mounted



Dimensions							Designation	Speed limit grease	Mass
d	D	B	C	T	T <sub>1</sub>	r <sub>s</sub> min.	r <sub>1s</sub> min.		oil
mm									
<b>45</b>	85	21	19	57,5	46	1,5	0,6	<b>32209 AP2F2DBT57,5</b>	3600 4800 1,28
	85	23	19	55	43,5	1,5	0,6	<b>32209 AP4DBT55</b>	3600 4800 1,26
<b>55</b>	100	22,52	21	69,5	57,66	2	0,6	<b>32211 AP2F2DBT69,5</b>	3000 4000 2,06
	100	25	21	69,5	58	2	0,6	<b>32211 AUPDBT69,5</b>	3000 4000 1,15
<b>70</b>	110	25	19	58	46	1,5	0,5	<b>32014 XADBT58</b>	2600 3400 1,87
<b>80</b>	125	29	22	70	56	1,5	0,6	<b>32016 XADBT70</b>	2000 2800 3,08
<b>90</b>	140	32	24	75	59	2	0,6	<b>32018 XADBT75</b>	1800 2600 3,95
<b>100</b>	180	46	39	140	120	3	0,8	<b>32220 AS1DBT140</b>	1400 2000 12,6
<b>110</b>	200	52,5	46	112	105	0,6	2,5	<b>32222 ADFT112</b>	1400 1900 7,77
	240	50	42	109	100	1	3	<b>30322 ADFT1109</b>	1300 1800 12,6
<b>120</b>	215	58	50	123	116	0,6	2	<b>32224 ADFT123</b>	1300 1800 18,7
	260	55	46	119	110	1	3	<b>30324 ADFT119</b>	1200 1600 29,8
	260	86	69	181	172	1	3	<b>32324 ADFT181</b>	1000 1400 46,2
<b>130</b>	200	45	34	90	90	0,6	2	<b>32026 XAPSS0DFT90</b>	1300 1800 10,6
	230	64	54	135,5	128	1	3	<b>32226 ADFT135,5</b>	1200 1600 23,1
	280	66	45	144	132	2	4	<b>31326 ADFT144</b>	950 1400 40,5
<b>140</b>	250	68	58	163,5	136	3	1	<b>32228 ADBT164</b>	1100 1500 30,9
<b>170</b>	310	86	71	202	162	5	1,5	<b>32234 AMDBT202</b>	800 1200 64,1
	310	86	71	202	162	5	1,5	<b>32234 AMP5DBT202</b>	800 1200 64,1

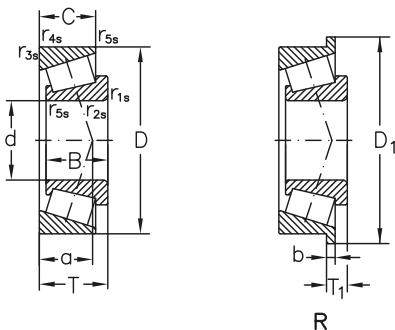


#### Basic radial load. Factors

#### Mounting dimensions

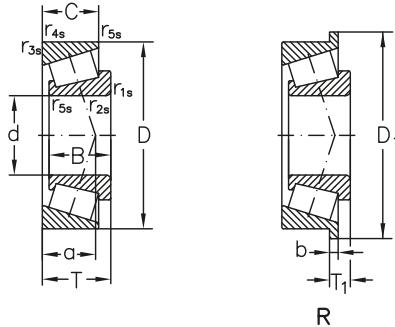
Cr	dyn.	e	$\gamma_1$	$\gamma_2$	stat $C_{0r}$	$\gamma_0$	$d_u$ min./max.	$D_u$ min.	$D_u$ max.	$C_u$ min.	$r_u$ max.	$r_{u1}$ max.
	kN	-			kN	-						
125	0,4	1,7	2,5	185	1,6	52	80			5,5	1,5	0,6
125	0,4	1,7	2,5	185	1,6	52	80			5,5	1,5	0,6
155	0,4	1,7	2,5	230	1,6	64	95			5,5	1,5	0,6
155	0,4	1,7	2,5	230	1,6	64	95			5,5	1,5	0,6
155	0,43	1,6	2,3	285	1,6	77	105			6	1,5	0,6
210	0,43	1,6	2,3	395	1,6	87	120			7	1,5	0,6
260	0,43	1,6	2,3	490	1,6	99	134			8	2	0,6
520	0,43	1,6	2,3	890	1,6	112	171			10	3	1
660	0,43	1,6	2,3	1160	1,6	126	170	188		6	2,5	1
780	0,35	1,9	2,8	1180	1,8	141	206	226		8	3	1
720	0,43	1,6	2,3	1310	1,6	136	181	203		7	2,5	1
920	0,35	1,9	2,8	1420	1,8	152	221	246		10	3	1
1290	0,35	1,9	2,8	2210	1,8	148	213	246		9	3	1
510	0,43	1,6	2,3	1050	1,6	144	178	190		8	2	0,6
890	0,43	1,6	2,3	1670	1,6	146	193	216		7	3	1
970	0,83	0,8	1,2	1520	0,8	157	218	262		9	4	1,5
980	0,43	1,6	2,3	1810	1,6	154	238			13,5	4	1
1440	0,43	1,6	2,3	2750	1,6	188	294			20	5	1,5
1440	0,43	1,6	2,3	2750	1,6	188	294			20	5	1,5

## Tapered roller bearings, single row inch dimensions



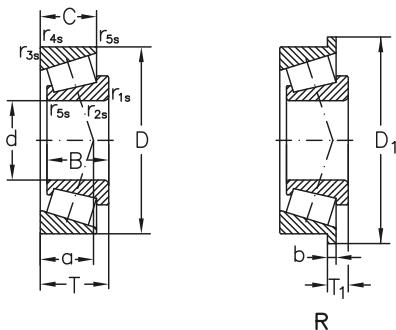
Dimensions									Designation
d	D	B	C	T	r <sub>1s</sub> , r <sub>2s</sub> min.	r <sub>3s</sub> , r <sub>4s</sub> min.	D <sub>1</sub>	b	a
mm									
<b>11,112</b>	34,988	10,988	8,73	10,998	1,3	1,3	9	<b>A4044/A4138</b>	-
<b>12,7</b>	34,988	10,988	8,73	10,998	1,3	1,3	9	<b>A4050/4138</b>	
<b>14,989</b>	34,988	10,988	8,73	10,998	0,8	1,3	9	<b>A4059/4138</b>	
<b>17,462</b>	39,878	14,605	10,668	13,843	1,3	1,3	9	<b>LM11749/LM11710</b>	
<b>19,05</b>	45,237	16,637	12,065	15,494	1,3	1,3	10	<b>LM11949/LM11910</b>	
	49,225	19,05	14,288	18,034	1,3	1,3	11	<b>09067/09195</b>	
<b>21,43</b>	50,005	18,288	13,97	17,526	1,3	1,3	11	<b>M12649/M12610</b>	
<b>21,986</b>	45,237	16,637	12,065	15,494	1,3	1,3	10	<b>LM12749/LM12710</b>	
	45,974	16,637	12,065	15,494	1,3	1,3	10	<b>LM12749/LM12711</b>	
<b>25</b>	51,994	14,26	12,7	15,011	1,5	1,3	12	<b>07097/07204</b>	
<b>25,4</b>	50,005	14,26	9,525	13,495	1	1	11	<b>07100/07196</b>	
	50,292	14,732	10,668	14,224	1,3	1,3	11	<b>L44643/L44610</b>	
<b>26,988</b>	50,292	14,732	10,668	14,224	3,5	1,3	11	<b>L44649/L44610</b>	
<b>29</b>	50,292	14,732	10,668	14,224	3,5	1,3	11	<b>L45449/L45410</b>	
<b>31,75</b>	59,131	16,764	11,811	15,875	*	1,3	13	<b>LM67048/LM67010</b>	
	62	19,05	14,288	18,161	3,5	1,3	13	<b>15123/15245</b>	
<b>34,925</b>	65,088	18,288	13,97	18,034	*	1,3	14	<b>LM485448/LM48510</b>	
	72,233	25,4	19,842	25,4	2,3	2,3	21	<b>HM88649/HM88610</b>	
	76,2	28,575	23,02	29,37	3,5	3,3	23	<b>HM89446/HM894410</b>	
<b>34,988</b>	59,131	16,764	11,938	15,875	*	1,3	13	<b>L68149/L68110</b>	
	59,974	16,764	11,938	15,875	*	1,3	13	<b>L68149/L68111</b>	
<b>38</b>	63	17	13,5	17	*	1,3	14	<b>JL69349/JL69310</b>	
<b>38,1</b>	65,088	18,288	13,97	18,04	2,3	1,3	13	<b>LM29749/LM29710</b>	
	79,375	29,771	23,812	29,37	3,5	3,3	20	<b>3490/3420</b>	

\* Special mounting chamfer.

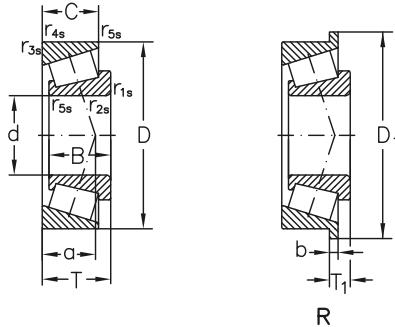


dyn. $C_r$	$e$	$\gamma$	stat $C_{0r}$	$\gamma_0$	Speed limit		Mass Kg
					kN	-	
						min <sup>-1</sup>	
						grease	oil
12,0	0,45	1,3	11,85	0,7	11000	15000	0,055
12,0	0,45	1,3	11,85	0,7	10000	15000	0,058
12,0	0,45	1,3	11,85	0,7	10000	14000	0,063
19,8	0,29	2,1	21,1	1,2	8500	12000	0,081
25,5	0,30	2,0	25,104	1,1	7500	11000	0,123
31,1	0,27	2,3	33,1	1,2	7000	10000	0,160
34,1	0,28	2,2	38	1,2	7000	10000	0,160
25,2	0,31	2,0	27,7	1,1	7500	10000	0,122
25,2	0,31	2,0	27,7	1,1	7000	10000	0,123
23,7	0,4	1,5	27,5	0,8	6300	9000	0,140
23,7	0,4	1,5	27,5	0,8	6300	9500	0,115
23,4	0,37	1,6	25,913	0,9	6300	9000	0,125
23,4	0,37	1,6	25,913	0,9	6300	9000	0,115
24,1	0,37	1,6	32,2	0,9	6300	9000	0,115
31,1	0,41	1,5	35,912	0,8	5300	7500	0,180
43,9	0,35	1,7	49,708	0,9	5300	7500	0,228
42,9	0,38	1,6	50,696	0,9	4800	7000	0,248
66,5	0,55	1,1	86,61	0,6	4500	6700	0,487
72,5	0,55	1,1	97,9	0,6	4500	6300	0,570
30,1	0,42	1,4	38,841	0,8	5300	7500	0,170
30,1	0,42	1,4	38,841	0,8	5300	7500	0,180
32,9	0,42	1,4	43,8	0,8	4800	7000	0,221
38,4	0,33	1,8	48,72	1,0	4800	6700	0,227
79,3	0,36	1,6	103	0,9	4300	6000	0,550

## Tapered roller bearings, single row inch dimensions



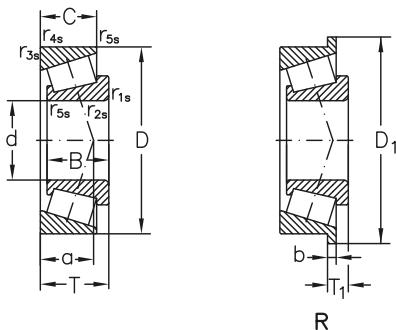
Dimensions									Designation
d	D	B	C	T	r <sub>1s</sub> , r <sub>2s</sub> min.	r <sub>3s</sub> , r <sub>4s</sub> min.	D <sub>1</sub>	b	a
mm									
<b>39,688</b>	73,025	22,098	21,336	25,654	0,8	2,3		18	<b>M201047/M201011</b>
<b>41,275</b>	73,431	19,812	14,732	19,559	3,5	0,8		16	<b>LM501349/LM501310</b>
<b>44,45</b>	73,025	18,258	15,083	18,258	1,5	1,5		14	<b>L102849/L102810</b>
	82,931	25,4	19,05	23,813	3,6	0,8		18	<b>25580/25520</b>
	95,25	28,575	22,225	27,783	0,8	0,8		20	<b>460/453 A</b>
<b>45,242</b>	73,431	19,812	15,748	19,558	3,5	0,8		15	<b>LM102949/LM102910</b>
<b>45,618</b>	82,931	25,4	19,05	23,812	3,5	0,8		18	<b>25590/25520</b>
	82,931	25,4	22,225	26,988	3,5	2,3		19	<b>25590/25523</b>
<b>46,038</b>	85	25,608	20,638	25,4	0,8	1,3		19	<b>2984A/2924</b>
<b>47,625</b>	93,264	30,302	23,812	30,162	3,5	0,8		21	<b>3779/3730</b>
<b>50</b>	90	22,225	15,875	8,887	2	0,8	94,661	4,762	16 <b>365/362 R</b>
<b>50,8</b>	82,55	22,225	16,51	21,59	3,5	1,3		16	<b>LM104949/LM104911</b>
	92,075	25,4	19,845	24,608	3,5	0,8		20	<b>28580/28521</b>
	92,25	28,575	22,225	27,783	3,5	0,8		20	<b>33889/33822</b>
	97,63	24,608	19,446	9,124	3,5	0,8	101,549	3,962	21 <b>28678/28622 R</b>
	107,95	29,317	22,225	27,783	3,5	0,8		21	<b>33885/33822</b>
<b>53,975</b>	123,825	32,791	25,4	17,462	3,5	3,3	130,073	6,35	37 <b>72212/72487 R</b>
<b>57,15</b>	104,775	29,317	24,605	30,162	2,3	3,3		23	<b>462A/453 X</b>
	110	29,317	27	27,795	3,5	2		24	<b>462/454</b>
	112,712	30,162	23,812	30,162	8	3,3		23	<b>39581/39520</b>
<b>60,325</b>	127	36,512	26,988	36,512	3,5	3,3		32	<b>HM813841/HM813810</b>
<b>63,485</b>	95	15,5	12	17	1	1		28	<b>L910349/L910310</b>
<b>63,5</b>	92,075	12,7	9,525	13,495	1,5	1,5		16	<b>LL510749/LL510710</b>
	112,712	30,048	23,812	11,112	3,5	3,3	117,373	4,762	25 <b>3982/3920 R</b>
	112,712	30,048	23,812	30,162	3,5	3,3		25	<b>3982/3920</b>
	112,712	30,048	23,812	30,162	3,5	0,8		25	<b>3982/3928</b>
	112,712	30,048	23,812	30,162	3,5	3,3		23	<b>39585/39520</b>
	120	29,007	23,444	29,007	3,5	3,3		26	<b>483/472 A</b>
	122,238	38,43	29,77	38,305	3,5	2		27	<b>X3962/X3963</b>
<b>66,675</b>	110	25,4	19,05	25,4	3,5	1,3		24	<b>29590/29521</b>
	112,712	30,048	23,812	30,162	3,5	3,3		25	<b>3984/3920</b>
	122,238	38,354	29,718	38,1	3,5	3,3		27	<b>HM212049/HM212011</b>



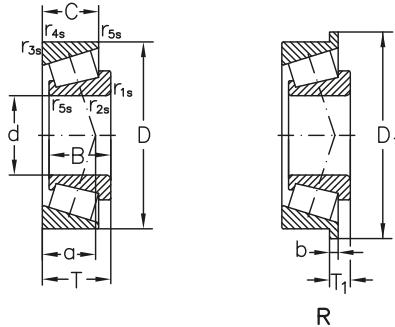
#### Basic radial load. Factors

dyn. $C_r$	e	$\gamma$	stat $C_{0r}$	$\gamma_0$	Speed limit	Mass
kN	-		kN	-	min <sup>-1</sup>	Kg
57,5	0,33	1,8	72,0	1,0	4300	6300 0,460
48,6	0,40	1,5	64,3	0,8	4300	6000 0,320
47,0	0,32	1,9	68,9	1,0	4300	6000 0,300
75,7	0,33	1,8	95,1	1,0	3800	5600 0,554
96,8	0,33	1,8	127,0	1,0	3600	5000 0,970
97,8	0,34	1,8	134	1,0	3000	4500 1,10
48,5	0,31	2,0	66,4	1,1	4000	6000 0,300
70	0,33	1,8	95,2	1,0	3800	5300 0,550
70	0,33	1,8	95,2	1,0	3800	5300 0,580
68,3	0,35	1,7	97	1,0	3800	5300 0,600
98,0	0,34	1,8	128	1,0	3400	5000 0,905
74,3	0,32	1,9	87,26	1,0	3400	5000 0,554
65,2	0,31	2,0	86,2	1,1	3600	5300 0,411
71	0,38	1,6	103	0,9	3400	4800 0,690
102	0,33	1,8	135	1,0	3400	4800 0,860
101	0,40	1,5	147	0,8	3400	4800 0,850
143	0,74	0,8	162	0,4	2800	4000 2,10
97,8	0,34	1,8	134	1,0	3000	4500 1,10
109	0,34	1,8	139	1,0	3000	4300 1,22
130	0,34	1,8	196	1,0	2800	4000 1,03
161	0,50	1,2	226	0,7	2600	3800 2,16
42,3	0,78	0,8	56,8	0,4	3000	4500 0,400
31,2	0,40	1,5	46,0	0,8	3200	4500 0,250
116	0,40	1,5	174	0,8	2800	4000 1,26
116	0,40	1,5	174	0,8	2800	4000 1,24
116	0,40	1,5	174	0,8	2800	4000 1,24
130	0,34	1,8	196	1,0	2800	4000 1,22
133	0,38	1,6	167	0,9	2600	3800 1,44
189	0,34	1,8	248	1,0	2600	3800 2,03
92,0	0,44	1,4	138	0,7	2800	4000 0,900
113	0,40	1,5	172	0,8	2800	4000 1,20
189	0,34	1,8	248	1,0	2600	3800 1,92

## Tapered roller bearings, single row inch dimensions

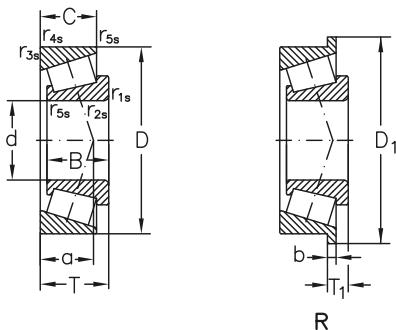


	Dimensions								Designation	
d	D	B	C	T	r <sub>1s</sub> , r <sub>2s</sub> min.	r <sub>3s</sub> , r <sub>4s</sub> min.	D <sub>1</sub>	b	a	
mm										
<b>71,438</b>	127	36,17	28,575	36,512	3,5	3,3	28	<b>567A/563</b>		
	136,525	46,038	36,512	46,038	3,5	3,3	38	<b>H715345/H715311</b>		
<b>73,025</b>	127	36,17	28,575	36,512	3,5	3,3	28	<b>567/563</b>		
	146,05	41,275	31,75	41,275	3,5	3,3	34	<b>657/653</b>		
<b>76,2</b>	139,992	36,098	28,575	36,512	3,5	3,3	31	<b>575/572</b>		
	161,925	55,1	42,862	53,975	3,5	3,3	40	<b>6576/6535</b>		
<b>77,788</b>	120	23,012	16	23	3,5	2,3	24	<b>34306/34472 X</b>		
<b>82,55</b>	139,992	36,098	28,575	36,512	3,5	3,3	31	<b>580/572</b>		
	146,05	41,275	31,75	41,275	3,5	3,3	34	<b>663/653</b>		
	161,925	48,26	38,1	47,625	3,5	3,3	35	<b>757/752</b>		
<b>85,725</b>	133,35	29,769	25,4	33,338	3,3	3,3	31	<b>497/492 W</b>		
	146,05	41,275	31,75	41,275	6,4	3,3	34	<b>665A/653</b>		
<b>88,9</b>	152,4	39,688	30,163	39,688	6,4	3,3	34	<b>HMS18445/HM518410</b>		
	190,5	57,531	46,038	57,15	8	3,3	41	<b>HM221434/HM221410</b>		
<b>89,974</b>	146,975	40	32,5	40	7	3,5	31	<b>HM218248/HM218210</b>		
<b>92</b>	140	30	22	30	3,5	1,5	32	<b>LM718947/XC18140 D</b>		
<b>92,075</b>	152,4	36,322	30,162	39,688	6,4	3,3	35	<b>598A/592 A</b>		
	171,45	48,26	38,1	47,625	3,5	3,3	37	<b>77362/77675</b>		
<b>95,25</b>	148,43	28,971	21,433	28,575	3	3	33	<b>42375/42584</b>		
	152,4	36,322	30,162	15,875	3,5	3,3	35	<b>594/592 R</b>		
<b>96,838</b>	149,225	28,971	24,608	12,7	3,5	3,3	34	<b>42381/42587 R</b>		
<b>100,012</b>	157,162	36,116	26,195	36,512	3,5	3,3	36	<b>52393/52618</b>		
<b>101,6</b>	180,975	48,006	38,1	17,462	3,5	3,3	40	<b>780/772 R</b>		
	212,725	66,675	53,975	66,675	7	3,3	48	<b>HH224335/HH224310</b>		

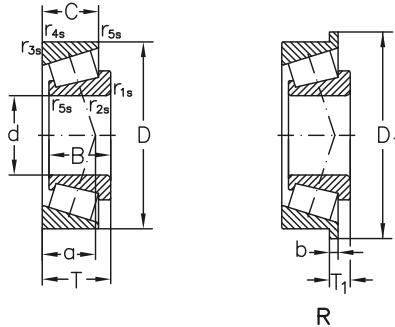


dyn. Cr	e	Y	stat $C_{0r}$	$\gamma_0$	Speed limit		Mass Kg
					kN	-	
						min <sup>-1</sup>	
						grease	oil
161	0,36	1,7	226	0,9	2400	3600	1,64
219	0,48	1,2	296	0,7	2400	3400	2,91
161	0,36	1,7	226	0,9	2400	3400	2,68
213	0,41	1,5	307	0,8	2200	3200	3,31
184	0,40	1,5	239	0,8	2200	3200	2,35
327	0,40	1,5	448	0,8	2000	3000	5,37
84,91	0,45	1,3	117	0,7	2400	3600	0,836
168	0,40	1,5	247	0,8	2200	3200	2,13
201	0,41	1,5	286	0,8	2200	3000	3,73
272	0,34	1,8	358	1,0	2000	2800	4,70
135	0,45	1,3	203	0,7	2200	3200	1,34
213	0,41	1,5	307	0,8	2200	3000	2,60
235	0,40	1,5	338	0,8	2000	3000	2,80
395	0,34	1,8	526	1,0	1800	2600	8,85
220	0,33	1,8	386	1,0	2000	3000	2,59
140	0,48	1,3	213	0,7	2200	3000	1,52
174	0,44	1,4	268	0,7	2000	2800	2,59
305	0,37	1,6	416	0,9	1900	2600	4,79
136	0,49	1,2	416	0,7	2000	2800	1,72
204	0,44	1,4	313	0,7	2000	2800	2,64
136	0,49	1,2	210	0,7	2000	2800	1,74
142	0,47	1,3	195	0,7	1900	2800	2,47
321	0,39	1,6	462	0,9	1700	2400	5,50
557	0,33	1,8	783	1,0	1600	2200	11,1

## Tapered roller bearings, single row inch dimensions

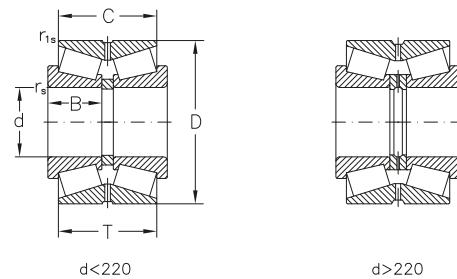


Dimensions									Designation	
d	D	B	C	T	r <sub>1s</sub> , r <sub>2s</sub> min.	r <sub>3s</sub> , r <sub>4s</sub> min.	D <sub>1</sub>	b	a	
mm										
<b>120,65</b>	174,625	36,512	27,783	35,72	3,5	1,5				<b>M224749/M224710</b>
	206,375	47,625	34,925	47,625	3,5	3,5				<b>795/792</b>
<b>127</b>	215,9	47,625	34,925	47,625	3,5	3,3				<b>74500/74850</b>
<b>130</b>	234,95	63,5	49,213	63,5	6	3,3				<b>95512/95925</b>
<b>133,35</b>	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		<b>74525/74850 R</b>
<b>136,525</b>	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		<b>74525/74850 R</b>
<b>139,7</b>	215,9	47,625	34,925	20,638	3,5	3,3	223,733	7,938		<b>74550/74850 R</b>
	215,9	47,625	34,925	47,625	3,5	3,3				<b>74550/74850</b>
	215,9	47,625	34,925	47,625	3,5	3,3				<b>74550/74850</b>
<b>158,75</b>	225,425	39,688	33,338	13,495	3,5	3,3	230,881	5,558		<b>46780/46720 R</b>
	225,425	39,688	33,338	41,275	3,5	3,3				<b>46780/46720</b>
<b>180</b>	250	45	37	47	3	3				<b>JM736149/JM36110</b>
<b>196,85</b>	254	27,783	21,433	28,575	1,5	1,5				<b>L540049/L540010</b>
<b>203,2</b>	261,142	27,783	21,433	28,575	1,5	1,5				<b>LL641149/LL641110</b>
<b>209,55</b>	282,575	46,038	36,512	46,038	3,5	3,3				<b>67989/67920</b>
	317,5	63,5	46,038	63,5	4,3	3,3				<b>93825/93125</b>
<b>234,95</b>	327,025	52,388	36,512	52,388	6,4	3,3				<b>8575/8520</b>
<b>241,3</b>	327,025	52,388	36,512	25,4	6,4	3,3	336,448	9,525		<b>8578/8520 R</b>

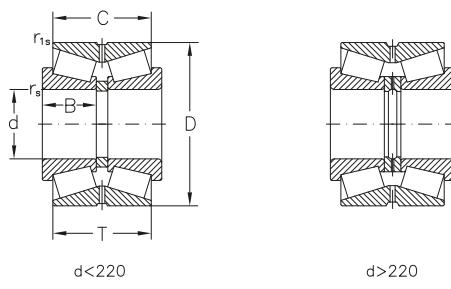


dyn. Cr kN	e	Y	stat $C_{0r}$ kN	$\gamma_0$	Speed limit		Mass Kg
					grease min <sup>-1</sup>	oil min <sup>-1</sup>	
220	0,33	1,8	375	1,0	1700	2400	2,70
308	0,49	1,2	523	0,7	1400	2000	6,97
507	0,36	1,6	784	0,9	1300	1900	11,3
313	0,49	1,2	528	0,7	1400	2000	6,78
313	0,49	1,2	528	0,7	1400	2000	6,53
310	0,49	1,2	531	0,7	1400	2000	6,17
310	0,49	1,2	531	0,7	1400	2000	6,08
310	0,49	1,2	531	0,7	1400	2000	6,08
305	0,38	1,6	541	0,9	1300	1800	5,40
305	0,38	1,6	541	0,9	1300	1800	5,35
334	0,48	1,3	703	0,7	1100	1600	7,85
170	0,39	1,5	334	0,9	1100	1600	3,32
174	0,41	1,5	353	0,8	1100	1500	3,56
331	0,51	1,2	661	0,6	1000	1400	8,84
651	0,52	1,2	1098	0,6	950	1300	18,5
468	0,41	1,5	934	0,8	850	1200	12,3
468	0,41	1,5	934	0,8	850	1200	11,9

## Tapered roller bearings, double row



Dimensions							Designation	
d	D	B	C	T	$r_1$ min.	$r_{1s}$ min.	-	
mm								
160	240	48	94	115	3	1	35032	
180	280	60	108	134	3	1	35036	
200	310	66	123	152	3	1	35040	
220	340	72	130	165	4	1	35044	



Basic radial load. Factors						Speed limit		Mass
dyn. Cr	e	$\gamma_1$	$\gamma_2$	stat $C_{0r}$	$\gamma_0$	grease	oil	
kN	-			kN	-	$\text{min}^{-1}$		Kg
662	0,37	1,8	2,7	1288	1,8	950	1400	17,0
1154	0,29	2,3	3,5	2352	2,3	850	1200	29,9
1268	0,37	1,0	2,7	2526	1,8	800	1100	39,3
1469	0,34	2,0	2,9	3032	1,9	750	1000	50,1

## Tapered roller bearings, double row

Inch dimensions

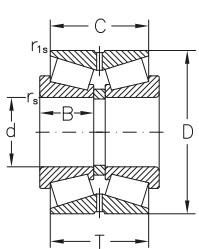


Fig. 1

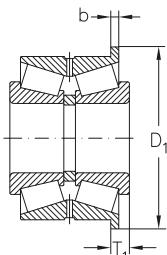


Fig. 2

Dimensions							Designation	
d	D	B	C	T	r <sub>1</sub> min.	r <sub>1s</sub> min.		
mm								
<b>69,85</b>	114,287	25,4	46,038	58,738	1,5	0,8	<b>29675/29622 DC</b>	
	120	29,007	53,975	65,09	3,5	0,8	<b>482/472 D</b>	
<b>73,025</b>	114,287	25,4	46,038	58,738	3,5	0,8	<b>29685/29622 D</b>	
<b>82,55</b>	136,525	29,769	53,975	69,85	3,5	0,8	<b>495/493 D</b>	
<b>85,725</b>	136,525	29,769	53,975	69,85	3,5	0,8	<b>497/493 DC</b>	
<b>92,075</b>	149,225	28,971	52,387	66,672	3,5	0,8	<b>42362/42587 D</b>	
<b>107,95</b>	158,75	21,4	39,688	53,978	3,5	0,8	<b>37425/37626 D</b>	
	159,987	34,925	58,738	74,89	3,6	0,8	<b>LM4522546/LM522510 DC</b>	
<b>114,3</b>	190,5	49,2	80,962	106,362	3,5	1,5	<b>71450/7175 D</b>	
<b>115</b>	190,5	50	82,6	108	3,5	1	<b>181115/181190 XG</b>	
<b>127</b>	196,85	46	85,725	101,6	3,5	0,8	<b>67388/67322 D</b>	
<b>136,525</b>	190,5	39,7	73,025	85,725	3,5	0,8	<b>48393/48320 D</b>	
	215,9	51	92	110	2,5	1	<b>200136X/200215 XH<sup>1)</sup></b>	
<b>152,4</b>	222,25	46,8	76,2	100,01	3,5	0,8	<b>M231649/M23160 D</b>	
	222,25	46,8	76,2	100,01	3,5	0,8	<b>M231649/M23160 D</b>	
<b>203,2</b>	282,575	46,038	82,55	101,6	3,5	0,8	<b>67983/67920 DC</b>	

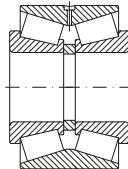


Fig. 3

dyn. Cr	e	Basic radial load. Factors		stat $C_{0r}$	$\gamma_0$	Speed limit		Mass	Fig.
		$\gamma_1$	$\gamma_2$			grease	oil		
kN	-			kN	-	min <sup>-1</sup>	Kg		
180	0,49	1,4	2,1	295	1,4	2400	3000	2,05	3
255	0,38	1,8	2,6	415	1,7	2200	2800	2,45	1
180	0,49	1,4	2,1	295	1,4	2400	2800	1,91	1
255	0,44	1,5	2,3	450	1,5	2000	2400	3,84	1
255	0,44	1,5	2,3	450	1,5	1900	2400	3,72	3
275	0,49	1,4	2,1	510	1,4	1800	2200	4,37	1
170	0,61	1,1	1,7	335	1,1	1600	2000	3,26	1
280	0,40	1,7	2,5	630	1,6	1600	2000	4,97	3
530	0,42	1,6	2,4	980	1,6	1400	1800	10,8	1
435	0,26	2,6	3,8	750	2,5	1400	1800	10,1	1
540	0,34	2,0	2,9	1130	1,9	1300	1700	10,6	1
395	0,33	2,1	3,1	940	2,0	1300	1700	6,88	1
540	0,25	2,7	4,1	960	2,7	1200	1500	12,2	2
540	0,33	2,0	3,0	1190	2,0	1200	1400	11,7	1
540	0,33	2,0	3,0	1190	2,0	1200	1400	11,7	1
600	0,51	1,3	2,0	1410	1,3	900	1100	17,8	1

**URB**



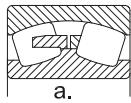
# Spherical roller bearings

Spherical roller bearings operate in arduous conditions. The spherical rollers can be symmetrical or unsymmetrical and are self-aligning in the outer ring spherical raceway. Thus, the possible coaxiality deviations of the supporting bearings as well as shaft bending can be compensated.

Spherical roller bearings are manufactured in the following constructive versions, depending on the bearing size and series.

## MB design

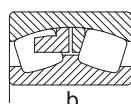
These bearings have a central fixed rib and machined cages guided on the inner ring rib.



a.

## MA design

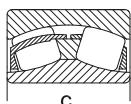
These bearings have a central fixed rib and machined cages guided on the outer ring rib.



b.

## C design

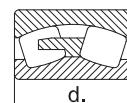
These bearings have a central guide rib floating on the inner ring, symmetrical rollers with larger dimensions so that the load carrying capacity increases. Special pressed sheet cage. Bearings of this design are of small and medium sizes.



c.

## CA design

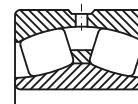
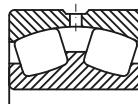
These bearings have side shoulders and a one-piece machined brass cage. They also have symmetrical rollers with larger dimensions so that the load carrying capacity increases. This design is available for medium and large-sized bearings



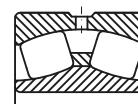
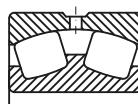
d.

Other constructive versions are shown below:

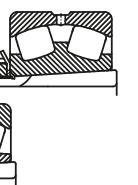
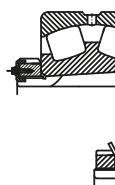
Cylindrical bore, lubrication groove and holes in the outer ring



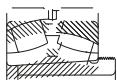
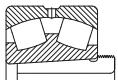
Tapered bore, lubrication groove and holes in the outer ring  
(taper 1:12, 1:30)



With adapter sleeves



With withdrawal sleeves



### Suffixes

- C** - modified inner design, increased basic load, symmetrical rollers, pressed sheet cage
- CA** - modified inner design, increased basic load, one-piece machined brass cage
- F2, F3** - constructive modifications
- K** - tapered bore bearings, taper 1:12
- K30** - tapered bore bearings, taper 1:30
- MA** - machined brass cage guided on the outer ring
- MB** - machined brass cage guided on the inner ring
- P** - two-piece outer ring
- W33** - lubrication groove and holes in the outer ring

### Tolerances

Spherical roller bearings with both cylindrical and tapered bore, are manufactured in normal tolerance class (see chapter Bearing tolerance, page 28).

### Radial Clearance

Spherical roller bearings are generally manufactured with normal radial clearance. At request, they can be manufactured with clearances larger than normal (C3, C4 etc.) or smaller than normal (C2).

The limit values of the radial clearance measured on unloaded bearings are in accordance with SR ISO 5753 and are given in tables 1 and 2.

### Dimensions

The main dimensions of spherical roller bearings are in accordance with ISO 15 and national standard SR 3918 respectively.

The dimensions of the adapter sleeves are in accordance with national standard SR ISO 2982-1.

Radial clearance of spherical roller bearings with cylindrical bore

Table 1

Bore diameter d over	Radial clearance									
	C2		Normal		C3		C4		C5	
up to	min	max	min	max	min	max	min	max	min	max
14	18	10	20	20	35	35	45	45	60	60
18	24	10	20	20	35	35	45	45	60	60
24	30	15	25	25	40	40	55	55	75	75
30	40	15	30	30	45	45	60	60	80	80
40	50	20	35	35	55	55	75	75	100	100
50	65	20	40	40	65	65	90	90	120	120
65	80	30	50	50	80	80	110	110	145	145
80	100	35	60	60	100	100	135	135	180	180
100	120	40	75	75	120	120	160	160	210	210
120	140	50	95	95	145	145	190	190	240	240
140	160	60	110	110	170	170	220	220	280	280
160	180	65	120	120	180	180	240	240	310	310
180	200	70	130	130	200	200	260	260	340	340
200	225	80	140	140	220	220	290	290	380	380
225	250	90	150	150	240	240	320	320	420	420
250	280	100	170	170	260	260	350	350	460	460
280	315	110	190	190	280	280	370	370	500	500
315	355	120	200	200	310	310	410	410	550	550
355	400	130	220	220	340	340	450	450	600	600
400	450	140	240	240	370	370	500	500	660	660
450	500	140	260	260	410	410	550	550	720	720
500	560	150	280	280	440	440	600	600	780	780
560	630	170	310	310	480	480	650	650	850	850
630	710	190	350	350	530	530	700	700	920	920
710	800	210	390	390	580	580	770	770	1010	1010

Radial clearance of spherical roller bearings with tapered bore

Table 2

Bore diameter d over	up to	Radial clearance									
		C2		Normal		C3		C4		C5	
		min	max	min	max	min	max	min	max	min	max
<b>18</b>	<b>24</b>	15	25	25	35	35	45	45	60	60	75
<b>24</b>	<b>30</b>	20	30	30	40	40	55	55	75	75	95
<b>30</b>	<b>40</b>	25	35	35	50	50	65	65	85	85	105
<b>40</b>	<b>50</b>	30	45	45	60	60	80	80	100	100	130
<b>50</b>	<b>65</b>	40	55	55	75	75	95	95	120	120	160
<b>65</b>	<b>80</b>	50	70	70	95	95	120	120	150	150	200
<b>80</b>	<b>100</b>	55	80	80	110	110	140	140	180	180	230
<b>100</b>	<b>120</b>	65	100	100	135	135	170	170	220	220	280
<b>120</b>	<b>140</b>	80	120	120	160	160	200	200	260	260	330
<b>140</b>	<b>160</b>	90	130	130	180	180	230	230	300	300	380
<b>160</b>	<b>180</b>	100	140	140	200	200	260	260	340	340	430
<b>180</b>	<b>200</b>	110	160	160	220	220	290	290	370	370	470
<b>200</b>	<b>225</b>	120	180	180	250	250	320	320	410	410	520
<b>225</b>	<b>250</b>	140	200	200	270	270	350	350	450	450	570
<b>250</b>	<b>280</b>	150	220	220	300	300	390	390	490	490	620
<b>280</b>	<b>315</b>	170	240	240	330	330	430	430	540	540	680
<b>315</b>	<b>355</b>	190	270	270	360	360	470	470	590	590	740
<b>355</b>	<b>400</b>	210	300	300	400	400	520	520	650	650	820
<b>400</b>	<b>450</b>	230	330	330	440	440	570	570	720	720	910
<b>450</b>	<b>500</b>	260	370	370	490	490	630	630	790	790	1000
<b>500</b>	<b>560</b>	290	410	410	540	540	680	680	870	870	1100
<b>560</b>	<b>630</b>	320	460	460	600	600	760	760	980	980	1230
<b>630</b>	<b>710</b>	350	510	510	670	670	850	850	1090	1090	1360
<b>710</b>	<b>800</b>	390	570	570	750	750	960	960	1220	1220	1500

The dimensions of the safety washers are in accordance with national standard SR ISO 2982-2.

The dimensions of the bearings nuts are in accordance with national standard SR ISO 2982-2.

The dimensions of the withdrawal sleeves are in accordance with national standard SR ISO 2982-1 and pages 793-800

Glass fibre reinforced polyamide 6.6 cages are successfully used for small and medium size bearings if the operating temperature doesn't exceed +120°C.

Large-size bearings are fitted with machined brass cages, CA design.

Designs and some technical data are given in table 4.

Permissible angular misalignment Table 3

Bearing series	Permissible angular misalignment degrees
<b>213</b>	1
<b>222</b>	1.5
<b>223</b>	2
<b>230</b>	1.5
<b>231</b>	1.5
<b>232</b>	2.5
<b>239</b>	1.5
<b>240</b>	2
<b>241</b>	2.5

### Misalignment

Spherical roller bearings allow angular misalignment between the outer ring and inner ring without any influence on the bearing rating life. Under normal loads and operating conditions and when the inner ring rotates, the values of the permissible misalignment depending on the bearing series are given in table 3.

### Cages

Small and medium size spherical roller bearing are fitted with pressed sheet or machined brass cages (Y). Bearings of normal design are fitted with machined brass or steel cages guided on the rollers (M), inner ring (MB) or outer ring raceway (MA).

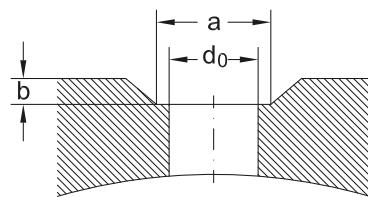
Cage design and some technical data

Table 4

Cage	Design bearing	Design cage	Application	Max. value
				D <sub>m</sub> n oil      grease
<b>Pressed sheet cage</b>			- General application - C design - Moderate speeds - Bearings with d≤200mm	300 x 10 <sup>3</sup> 225 x 10 <sup>3</sup>
<b>Polyamide cage TN</b>			- General application - Moderate and high speeds	400 x 10 <sup>3</sup> 300 x 10 <sup>3</sup>
<b>Machined brass M or steel F cage</b>			- General application - Bearings with d>40 mm	350 x 10 <sup>3</sup> 265 x 10 <sup>3</sup>
<b>Machined brass cage, CA design</b>			- General application - Bearings with d>200mm	350 x 10 <sup>3</sup> 265 x 10 <sup>3</sup>

#### Lubrication grooves and holes

Spherical roller bearings are provided with a lubrication groove and holes in the outer ring, excepting those of series 213. Designation suffix W33 is used to identify this feature on bearings. The dimensions of the groove, bore diameter and their number depending on the dimension series are given in table 5.



#### Axial load for bearings mounted on adapter sleeves

If the spherical roller bearings are mounted on a smooth shaft using an adapter sleeve, without

side support, the axial load carrying capacity depends on the friction between shaft and sleeve.

Considering that the mounting is correctly done, the permissible axial load can be accurately enough determined using the following equation

$$F_{a\max} = 3 B d, \text{ kN}$$

where:

$F_{a\max}$  - maximum permissible axial load, kN;  
B - bearing width, mm;  
d - bearing bore diameter, mm.

#### Equivalent dynamic radial load

$$P_r = F_r + Y_1 F_a, \text{ kN, for } F_a/F_r \leq e$$

$$P_r = 67 F_r + Y_2 F_a, \text{ kN, for } F_a/F_r > e$$

The values of the factors depending on the bearing type can be found in bearing tables.

**Dimensions of lubrication grooves and holes**

of Table 5

Series 23900			Series 23000			Series 24000		
Outer diameter range	d0	Dimensions a b	Outer diameter range	d0	Dimensions a b	Outer diameter range	d0	Dimensions a b
mm mm			mm mm			mm mm		
250... 360	4,5	7,2 1,5	170... 210	4,5	7,2 1,5	... 180	4,5	7,2 1,5
380... 420	4,5	7,2 2	225... 260	6	9,6 2	200... 225	6	9,6 2
440... 480	6	9,6 3	280... 310	7,5	12,1 2,5	240... 260	7,5	12,1 2,5
520... 540	7,5	12,1 3	310... 460	9	14,5 3	280... 480	9	14,5 3
560... 650	9	14,5 3	480... 980	12	19,7 3	520... 560	9	14,5 3
670... 1000	12	19,7 3,5				600... 980	12	19,7 3,5

Series 23100			Series 24100			Series 22200		
Outer diameter range	d0	Dimensions a b	Outer diameter range	d0	Dimensions a b	Outer diameter range	d0	Dimensions a b
mm mm			mm mm			mm mm		
165... 200	4,5	7,2 1,5	180... 210	3	4,9 1	72... 100	3	4,2 0,8
210... 250	6	9,6 2	... 225	4,5	7,2 1,5	110... 160	3	4,9 1
... 270	7,5	12,1 2,5	250... 270	4,5	9,6 2	170... 200	4,5	7,2 1,5
280... 400	9	14,5 3	280... 400	6	9,6 2	215... 250	6	9,6 2
440... 980	12	19,7 3	420... 500	7,5	12,1 2,5	270... 290	7,5	12,1 2,5
			540... 620	9	14,5 3	310... 400	9	14,5 3
			650... 980	12	19,7 3,5	440... 580	12	19,7 3,5

Series 23200			Series 22300			Series 21300		
Outer diameter range	d0	Dimensions a b	Outer diameter range	d0	Dimensions a b	Outer diameter range	d0	Dimensions a b
mm mm			mm mm			mm mm		
... 160	3	4,9 1	90... 120	3	4,9 1	... 80	3	4,2 0,8
180... 200	4,5	7,2 1,5	130... 180	4,5	7,2 1,5	90... 180	3	4,9 1
215... 250	6	9,6 2	190... 215	6	9,6 2	190... 215	4,5	7,2 1,5
270... 320	7,5	12,1 2,5	240... 260	7,5	12,1 2,5			
340... 400	9	14,5 3	280... 360	9	14,5 3			
400... 980	12	19,7 3,5	380... 580	12	19,7 3,5			

**Number of lubrication holes - all series**

Bore diameter range, mm      50... 240      260... 440      460... 950

Number of lubrication holes      3      4      6

### Equivalent static radial load

$$P_{0r} = F_r + Y_0 F_a, \text{ kN}$$

The value of the factor  $Y_0$  depending on the bearing type can be found in bearing tables.

### Abutment dimensions

For a proper location of bearing rings on the shaft and housing shoulder respectively, shaft

(housing) maximum connection radius  $r_{u \max}$  should be less than bearing minimum mounting chamfer  $r_{s \min}$ .

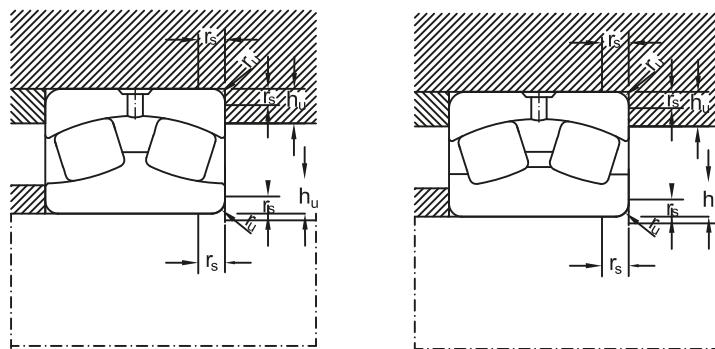
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.

The values of the connection radii and support shoulder height are given in table 6. The mounting dimensions for bearings with withdrawal sleeves are given in table 7.

**Dimensions of lubrication grooves and holes**

**of Table 6**

$r_{s \min}$	$r_{u \max}$	$h_{u \min}$ Bearing series	
		230	231, 213
		239	241, 223
		240	222, 233
			232
<b>mm</b>			
1	1	2,3	2,8
1,1	1	3	3,5
1,5	1,5	3,5	4,5
2	2	4,4	5,5
2,1	2,1	5,1	6
3	2,5	6,2	7
4	3	7,3	8,5
5	4	9	10
6	5	11,5	13
7,5	6	14	16
9,5	8	17	20



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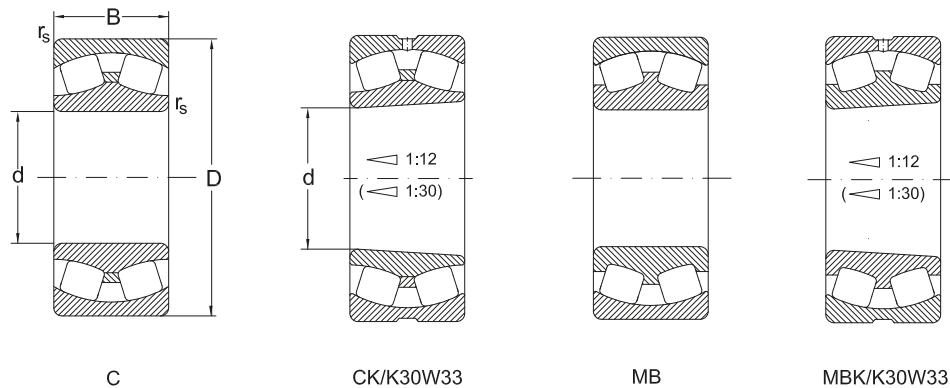
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## Spherical Roller Bearings SR 3918



d	D	B	Dimensions		Basical radial load				stat. $C_{0r}$
			$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>35</b>	80	21	1,5	66	0,28	2,4	3,6	65	
	80	21	1,5	66	0,28	2,4	3,6	65	
<b>40</b>	80	23	1,1	88	0,31	2,2	3,2	98	
	80	23	1,1	88	0,31	2,2	3,2	98	
	80	23	1,1	88	0,31	2,2	3,2	98	
	80	23	1,1	78	0,31	2,2	3,2	87	
	80	23	1,1	78	0,31	2,2	3,2	87	
	80	23	1,1	78	0,31	2,2	3,2	87	
	80	23	1,1	78	0,31	2,2	3,2	87	
	90	23	1,5	99	0,26	2,6	3,9	120	
	90	23	1,5	99	0,26	2,6	3,9	120	
	90	23	1,5	83	0,26	2,6	3,8	101	
	90	33	1,5	140	0,4	1,6	2,5	145	
	90	33	1,5	140	0,4	1,6	2,5	145	
	90	33	1,5	140	0,4	2,6	2,5	145	
	90	33	1,5	140	0,4	2,5	2,5	145	
	90	33	1,5	140	0,4	1,6	2,5	145	
	90	33	1,5	140	0,4	1,6	2,5	145	
	90	33	1,5	140	0,4	1,6	2,5	145	
	90	33	1,5	125	0,4	1,7	2,5	135	
	90	33	1,5	125	0,4	1,7	2,5	135	
	90	33	1,5	125	0,4	1,7	2,5	135	
	90	33	1,5	125	0,4	1,7	2,5	135	
<b>45</b>	85	23	1,1	93	0,26	2,6	3,8	105	
	85	23	1,1	93	0,26	2,6	3,4	105	
	85	23	1,1	93	0,26	2,6	3,4	105	

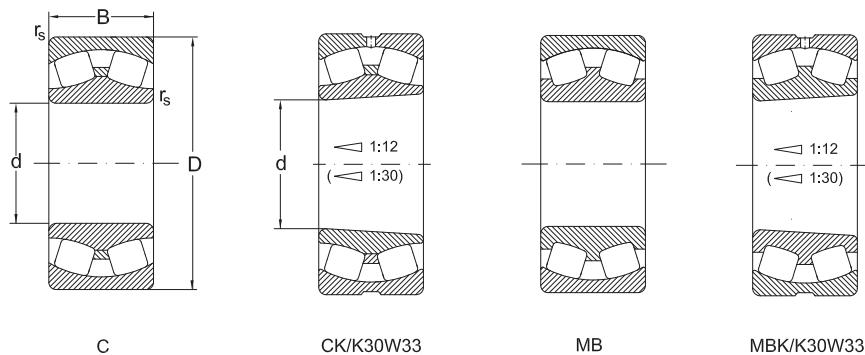
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>35</b>	2,4	5000	6400	<b>21307 MBKW33</b>	0,56
	2,4	5000	6400	<b>21307 MBW33</b>	0,56
<b>40</b>	2,1	4800	6300	<b>22208 C</b>	0,54
	2,1	4800	6300	<b>22208 CK</b>	0,54
	2,1	4800	6300	<b>22208 CKW33</b>	0,52
	2,1	4400	5800	<b>22208 MAC4F80W33</b>	0,654
	2,1	4400	5800	<b>22208 MB</b>	0,57
	2,1	4400	5800	<b>22208 MBK</b>	0,57
	2,1	4400	5800	<b>22208 MBKW33</b>	0,56
	2,1	4400	5800	<b>22208 MBW33</b>	0,56
	2,6	4500	6000	<b>21308 C</b>	0,710
	2,6	4500	6000	<b>21308 CK</b>	0,700
	2,5	4900	6500	<b>21308 CKW33</b>	0,700
	1,6	4300	5600	<b>22308 C</b>	0,97
	1,6	4300	5600	<b>22308 CK</b>	0,95
	1,6	4300	5600	<b>22308 CKW33</b>	0,93
	1,6	4300	5600	<b>22308 CW33</b>	0,96
	1,6	4300	5600	<b>22308 CY</b>	0,98
	1,6	4300	5600	<b>22308 CYK</b>	0,95
	1,6	4300	5600	<b>22308 CYKW33</b>	0,94
	1,6	4300	5600	<b>22308 CYW33</b>	0,972
<b>45</b>	1,6	3800	5000	<b>22309 MAKC4F80W33</b>	1,42
	1,6	3800	5000	<b>22308 MBK</b>	1
	1,6	3800	5000	<b>22308 MBKW33</b>	0,99
	1,6	3800	5000	<b>22308 MB</b>	1,02
	1,6	3800	5000	<b>22308 MBW33</b>	1,05
	2,5	4500	6000	<b>22209 C</b>	0,64
	2,5	4500	6000	<b>22209 CK</b>	0,62
	2,5	4500	6000	<b>22209 CKW33</b>	0,62

## Spherical Roller Bearings SR 3918



d	D	B	Dimensions		Basical radial load				stat. $C_{0r}$	
			$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$			
mm									kN	
<b>45</b>	85	23	1,1	93	0,26	2,6	2,4	105		
	85	23	1,1	77	0,28	2,4	3,5	87,5		
	85	23	1,1	77	0,28	2,4	3,5	87,5		
	85	23	1,1	77	0,28	2,4	3,5	87,5		
	85	23	1,1	77	0,28	2,4	3,5	87,5		
	100	25	1,5	120	0,26	2,6	3,9	135		
	100	25	1,5	120	0,26	2,6	3,9	135		
	100	25	1,5	120	0,26	2,6	3,9	135		
	100	25	1,5	105	0,28	2,4	3,6	107		
	100	36	1,5	165	0,35	1,9	2,9	190		
	100	36	1,5	165	0,35	1,9	2,9	190		
	100	36	1,5	165	0,4	1,9	2,9	190		
	100	36	1,5	165	0,4	1,9	2,9	190		
	100	36	1,5	150	0,4	1,7	2,5	175		
	100	36	1,5	150	0,4	1,7	2,5	175		
	100	36	1,5	150	0,4	1,7	2,5	175		
	100	36	1,5	150	0,4	1,7	2,5	175		
<b>50</b>	90	23	1,1	100	0,24	2,9	4,2	120		
	90	23	1,1	100	0,24	2,9	4,2	120		
	90	23	1,1	100	0,24	2,9	4,2	120		
	90	23	1,1	100	0,24	2,9	4,2	120		
	90	23	1,1	78	0,26	2,6	3,8	91,3		
	90	23	1,1	78	0,26	2,6	3,8	91,3		
	90	23	1,1	78	0,26	2,6	3,8	91,3		
	90	23	1,1	78	0,26	2,6	3,8	91,3		
	110	27	2	120	0,24	2,8	4,1	130		
	110	27	2	120	0,24	2,8	4,1	130		
	110	27	2	120	0,24	2,8	4,1	130		
	110	40	2	190	0,38	1,8	2,7	220		

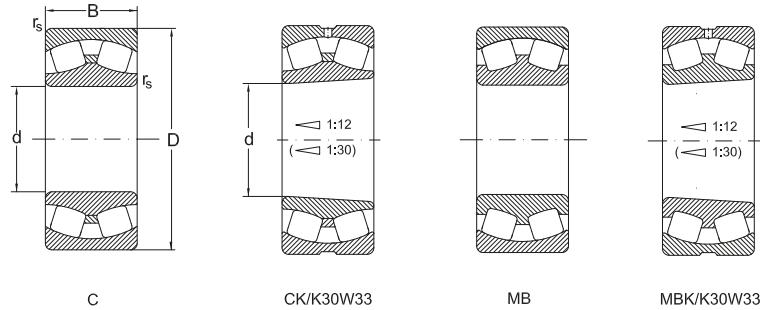
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>45</b>	2,5	4500	6000	<b>22209 CW33</b>	0,71
	2,3	4100	5500	<b>22209 MBK</b>	0,72
	2,3	4100	5500	<b>22209 MBKW33</b>	0,72
	2,3	4100	5500	<b>22209 MB</b>	0,72
	2,3	4100	5500	<b>22209 MBW33</b>	0,77
	2,6	4000	5300	<b>21309 C</b>	0,71
	2,6	4000	5300	<b>21309 CK</b>	0,54
	2,6	4000	5300	<b>21309 CKW33</b>	0,74
	2,3	3600	4800	<b>21309 MB</b>	0,77
	1,9	3800	5000	<b>22309 C</b>	1,38
	1,9	3800	5000	<b>22309 CK</b>	1,35
	1,9	3800	5000	<b>22309 CKW33</b>	1,38
	1,9	3800	5000	<b>22309 CW33</b>	1,38
	1,6	3400	4500	<b>22309 MBK</b>	1,36
	1,6	3400	4500	<b>22309 MBKW33</b>	1,36
	1,6	3400	4500	<b>22309 MB</b>	1,37
	1,6	3400	4500	<b>22309 MBW33</b>	1,36
<b>50</b>	2,7	4000	5300	<b>22210 C</b>	0,7
	2,7	4000	5300	<b>22210 CK</b>	0,69
	2,7	4000	5300	<b>22210 CKW33</b>	0,69
	2,7	4000	5300	<b>22210 CW33</b>	0,7
	2,5	3600	4800	<b>22210 MBK</b>	0,77
	2,5	3600	4800	<b>22210 MBKW33</b>	0,76
	2,5	3600	4800	<b>22210 MB</b>	0,77
	2,5	3600	4800	<b>22210 MBW33</b>	0,76
	2,7	3600	4800	<b>21310 C</b>	1,25
	2,7	3600	4800	<b>21310 CK</b>	1,20
	2,7	3600	4800	<b>21310 CKW33</b>	1,20
	1,7	3400	4500	<b>22310 C</b>	1,81

## Spherical Roller Bearings SR 3918



d	D	B	$r_s$ min.	Basical radial load					stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>50</b>	110	40	2	190	0,38	1,8	2,7	220	
	110	40	2	190	0,4	1,8	2,7	220	
	110	40	2	190	0,4	1,8	2,7	220	
	110	40	2	190	0,4	1,8	2,7	220	
	110	40	2	190	0,4	1,8	2,7	220	
	110	40	2	190	0,4	1,8	2,7	220	
	110	40	2	190	0,4	1,8	2,7	202	
	110	40	2	177	0,4	1,7	2,5	202	
	110	40	2	177	0,4	1,7	2,5	202	
	110	40	2	177	0,4	1,7	2,5	202	
	110	40	2	177	0,4	1,7	2,5	202	
<b>55</b>	100	25	1,5	120	0,27	2,7	4,1	140	
	100	25	1,5	120	0,27	2,7	4,1	140	
	100	25	1,5	120	0,27	2,7	4,1	140	
	100	25	1,5	120	0,27	2,7	4,1	140	
	100	25	1,5	94	0,26	2,6	3,9	107	
	100	25	1,5	94	0,26	2,6	3,9	107	
	100	25	1,5	94	0,26	2,6	3,9	107	
	100	25	1,5	94	0,26	2,6	3,9	107	
	120	29	2	135	0,24	2,8	4,1	155	
	120	29	2	135	0,24	2,8	4,1	155	
	120	43	2	230	0,4	1,7	2,5	265	
	120	43	2	230	0,4	1,7	2,5	265	
	120	43	2	230	0,4	1,7	2,5	265	
	120	43	2	230	0,4	1,7	2,5	265	
	120	43	2	230	0,4	1,7	2,5	265	

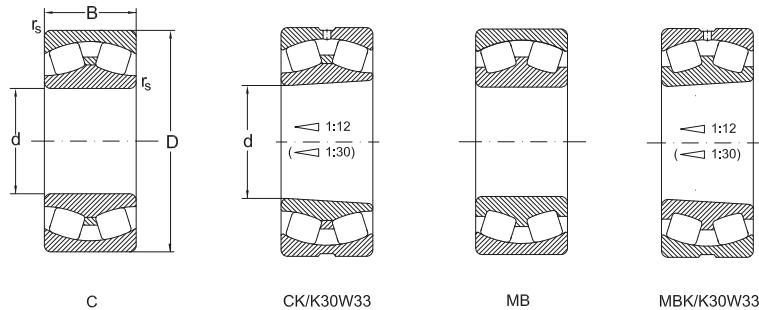
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>50</b>	1,7	3400	4500	<b>22310 CK</b>	1,77
	1,7	3400	4500	<b>22310 CKW33</b>	1,76
	1,7	3400	4500	<b>22310 CW33</b>	1,81
	1,7	3400	4500	<b>22310 CY</b>	1,82
	1,7	3400	4500	<b>22310 CYK</b>	1,81
	1,7	3400	4500	<b>22310 CYKW33</b>	1,77
	1,7	3400	4500	<b>22310 CYW33</b>	1,81
	1,6	3000	4000	<b>22310 MBK</b>	1,85
	1,6	3000	4000	<b>22310 MBKW33</b>	1,83
	1,6	3000	4000	<b>22310 MAC4F80W33</b>	1,83
	1,6	3000	4000	<b>22310 MB</b>	1,85
	1,6	3000	4000	<b>22310 MBW33</b>	1,84
<b>55</b>	2,7	3800	5000	<b>22211 C</b>	0,91
	2,7	3800	5000	<b>22211 CK</b>	0,9
	2,7	3800	5000	<b>22211 CKW33</b>	0,8
	2,7	3800	5000	<b>22211 CW33</b>	0,89
	2,5	3600	4600	<b>22211 MBK</b>	0,89
	2,5	3600	4600	<b>22211 MBKW33</b>	0,88
	2,5	3600	4600	<b>22211 MB</b>	0,91
	2,5	3600	4600	<b>22211 MBW33</b>	0,89
	2,7	3200	4300	<b>21311 C</b>	1,65
	2,7	3200	4300	<b>21311 CK</b>	1,60
	1,6	3000	4000	<b>22311 C</b>	2,32
	1,6	3000	4000	<b>22311 CK</b>	2,27
	1,6	3000	4000	<b>22311 CKW33</b>	2,25
	1,6	3000	4000	<b>22311 CW33</b>	2,32
	1,6	3000	4000	<b>22311 CY</b>	2,34
	1,6	3000	4000	<b>22311 CYK</b>	2,28

## Spherical Roller Bearings SR 3918



d	D	B	$r_s$ min.	Basical radial load					stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>55</b>	120	43	2	230	0,4	1,7	2,5	265	
	120	43	2	230	0,4	1,7	2,5	265	
	120	43	2	220	0,4	1,7	2,5	255	
	120	43	2	220	0,4	1,7	2,5	255	
	120	43	2	220	0,4	1,7	2,5	255	
	120	43	2	220	0,4	1,7	2,5	255	
	120	43	2	220	0,4	1,7	2,5	255	
	120	43	2	220	0,4	1,7	2,5	255	
<b>60</b>	110	28	1,5	145	0,27	2,7	4	175	
	110	28	1,5	145	0,27	2,7	4	175	
	110	28	1,5	145	0,27	2,7	4	175	
	110	28	1,5	117,8	0,27	2,6	3,8	140,3	
	110	28	1,5	117,8	0,27	2,6	3,8	140,3	
	110	28	1,5	117,8	0,27	2,6	3,8	140,3	
	110	28	1,5	117,8	0,27	2,6	3,8	140,3	
	130	31	2,1	150	0,24	2,9	4,3	180	
	130	31	2,1	150	0,24	2,9	4,3	180	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	270	0,4	1,7	2,5	320	
	130	46	2,1	260	0,4	1,7	2,5	310	
	130	46	2,1	260	0,4	1,7	2,5	310	

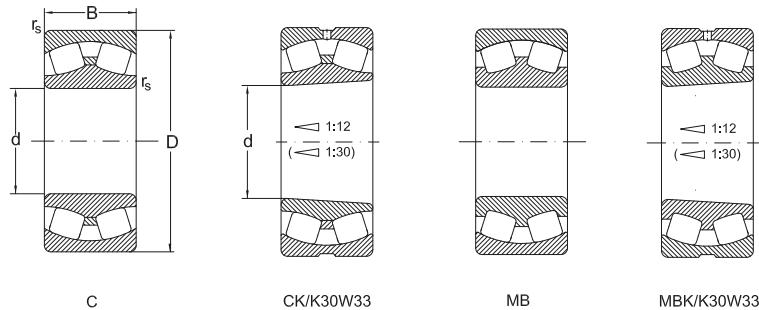
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>55</b>	1,6	3000	4000	<b>22311 CYKW33</b>	2,26
	1,6	3000	4000	<b>22311 CYW33</b>	2,32
	1,6	2800	3600	<b>22311 MBK</b>	2,1
	1,6	2800	3600	<b>22311 MAKW33</b>	2,44
	1,6	2800	3600	<b>22311 MA</b>	2,49
	1,6	2800	3600	<b>22311 MAC4F80W33</b>	2,42
	1,6	2800	3600	<b>22311 MAC4W502</b>	2,44
	1,6	2800	3600	<b>22311 MAW502</b>	2,44
	1,6	2800	3600	<b>22311 MB</b>	2,43
	1,6	2800	3600	<b>22311 MBW33</b>	2,42
<b>60</b>	2,7	3400	4500	<b>22212 C</b>	1,32
	2,7	3400	4500	<b>22212 CK</b>	1,29
	2,7	3400	4500	<b>22212 CKW33</b>	1,25
	2,5	3200	4100	<b>22212 MBK</b>	1,19
	2,5	3200	4100	<b>22212 MBKW33</b>	1,17
	2,5	3200	4100	<b>22212 MB</b>	1,17
	2,5	3200	4100	<b>22212 MBW33</b>	1,2
	2,8	3000	4000	<b>21312 C</b>	1,95
	2,8	3000	4000	<b>21312 CK</b>	1,90
	1,7	2800	3800	<b>22312 C</b>	2,91
	1,7	2800	3800	<b>22312 CK</b>	2,84
	1,7	2800	3800	<b>22312 CKW33</b>	2,8
	1,7	2800	3800	<b>22312 CW33</b>	2,87
	1,7	2800	3800	<b>22312 CY</b>	2,93
	1,7	2800	3800	<b>22312 CYK</b>	2,86
	1,7	2800	3800	<b>22312 CYKW33</b>	2,82
	1,7	2800	3800	<b>22312 CYW33</b>	2,89
	1,7	2600	3400	<b>22312 MBK</b>	3,04
	1,7	2600	3400	<b>22312 MBKW33</b>	3

## Spherical Roller Bearings SR 3918



d	D	B	r <sub>s</sub> min.	Basical radial load					stat. C <sub>0r</sub>
				dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>		
mm									
<b>60</b>	130	46	2,1	260	0,4	1,7	2,5	310	
	130	46	2,1	260	0,4	1,7	2,5	310	
	130	46	2,1	260	0,4	1,7	2,5	310	
	130	31	2,1	151	0,24	2,9	4,3	152	
<b>65</b>	120	31	1,5	180	0,28	2,4	3,6	220	
	120	31	1,5	180	0,28	2,4	3,6	220	
	120	31	1,5	180	0,28	2,4	3,6	220	
	120	31	1,5	180	0,28	2,4	3,6	220	
	120	31	1,5	165	0,28	2,4	3,6	200	
	120	31	1,5	165	0,28	2,4	3,6	200	
	120	31	1,5	165	0,28	2,4	3,6	200	
	120	31	1,5	165	0,28	2,4	3,6	200	
	120	31	1,5	165	0,28	2,4	3,6	200	
	140	33	2,1	220	0,24	2,8	4,2	290	
	140	33	2,1	220	0,24	2,8	4,2	290	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	305	0,39	1,7	2,6	360	
	140	48	2,1	280	0,39	1,7	2,6	360	
	140	48	2,1	280	0,39	1,7	2,6	330	
	140	48	2,1	280	0,39	1,7	2,6	330	
	140	48	2,1	280	0,39	1,7	2,6	330	
	140	48	2,1	280	0,39	1,7	2,6	330	
	140	48	2,1	280	0,39	1,7	2,6	330	
	140	48	1,5	280	0,38	1,8	2,6	330	

## Spherical Roller Bearings

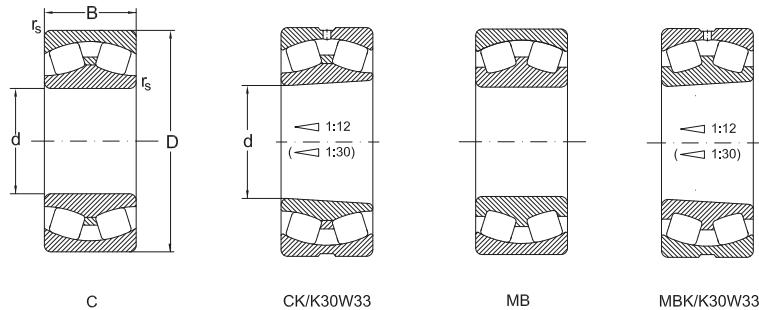
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>60</b>	1,7	2600	3400	<b>22312 MAC4F80W33</b>	3,07
	1,7	2600	3400	<b>22312 MB</b>	3,04
	1,7	2600	3400	<b>22312 MBW33</b>	3
	2,8	2800	3800	<b>21312 MBK</b>	2,13
<b>65</b>	2,4	3000	4000	<b>22213 C</b>	1,73
	2,4	3000	4000	<b>22213 CK</b>	1,51
	2,4	3000	4000	<b>22213 CKW33</b>	1,65
	2,4	3000	4000	<b>22213 CW33</b>	1,68
	2,4	2800	3600	<b>22213 MBK</b>	1,59
	2,4	2800	3600	<b>22213 MBKW33</b>	1,57
	2,4	2800	3600	<b>22213 MB</b>	1,62
	2,4	2800	3600	<b>22213 MBW33</b>	1,6
	2,8	2800	3800	<b>21313 C</b>	2,45
	2,8	2800	3800	<b>21313 CK</b>	2,40
	1,7	2800	3600	<b>22313 C</b>	3,57
	1,7	2800	3600	<b>22313 CK</b>	3,44
	1,7	2800	3600	<b>22313 CKW33</b>	3,49
	1,7	2800	3600	<b>22313 CW33</b>	3,51
	1,7	2800	3600	<b>22313 CY</b>	3,54
	1,7	2800	3600	<b>22313 CYK</b>	3,44
	1,7	2800	3600	<b>22313 CYKW33</b>	3,43
	1,7	2800	3600	<b>22313 CYW33</b>	3,53
	1,7	2400	3200	<b>22313 MBK</b>	3,71
	1,7	2400	3200	<b>22313 MBKW33</b>	3,71
	1,7	2400	3200	<b>22313 MA</b>	3,56
	1,7	2400	3200	<b>22313 MAC4F80W33</b>	3,77
	1,7	2400	3200	<b>22313 MAC4W502</b>	3,51
	1,7	2400	3200	<b>22313 MAW502</b>	3,51
	1,7	2400	3200	<b>22313 MB</b>	3,51

## Spherical Roller Bearings

### SR 3918



d	D	B	r <sub>s</sub> min.	Basical radial load					stat. C <sub>0r</sub>
				dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>		
mm									
<b>65</b>	140	48	1,5	280	0,39	1,7	2,6	330	
<b>70</b>	125	31	1,5	180	0,26	2,6	3,9	225	
	125	31	1,5	180	0,26	2,6	3,9	225	
	125	31	1,5	180	0,26	2,6	3,9	225	
	125	31	1,5	180	0,26	2,6	3,9	225	
	150	35	2,1	190	0,26	2,6	4	197	
	150	35	2,1	190	0,26	2,6	4	197	
	150	35	2,1	190	0,26	2,6	4	197	
	150	51	2,1	375	0,38	1,9	2,9	455	
	150	51	2,1	375	0,38	1,9	2,9	455	
	150	51	2,1	375	0,38	1,9	2,9	455	
	150	51	2,1	375	0,38	1,9	2,9	455	
	150	51	2,1	340	0,37	1,8	2,7	420	
	150	51	2,1	340	0,37	1,8	2,7	420	
	150	51	2,1	340	0,37	1,8	2,7	420	
	150	51	2,1	340	0,37	1,8	2,7	420	
	150	51	2,1	340	0,37	1,8	2,7	420	
<b>75</b>	130	31	1,5	190	0,23	2,9	4,4	250	
	130	31	1,5	190	0,23	2,9	4,4	250	
	130	31	1,5	190	0,24	2,9	4,4	250	
	130	31	1,5	190	0,24	2,9	4,4	250	
	130	31	1,5	175	0,24	2,8	4,1	230	
	130	31	1,5	175	0,24	2,8	4,1	230	
	130	31	1,5	175	0,24	2,8	4,1	230	
	130	31	1,5	175	0,24	2,8	4,1	230	
	160	55	2,1	380	0,34	2,9		131	
	160	37	2,1	280	0,23	2,9		360	
	160	37	2,1	280	0,23	2,9		360	

## Spherical Roller Bearings

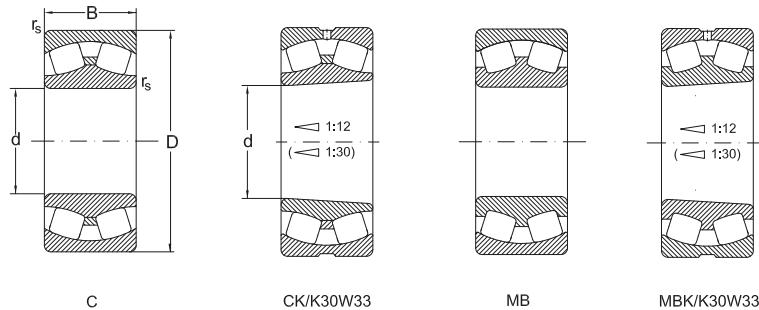
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>65</b>	1,7	2400	3200	<b>22313 MBW33</b>	3,7
<b>70</b>	2,6	2800	3800	<b>22214 C</b>	1,82
	2,6	2800	3800	<b>22214 CK</b>	1,82
	2,6	2800	3800	<b>22214 CKW33</b>	1,8
	2,6	2800	3800	<b>22214 CW33</b>	1,82
	2,6	2600	3400	<b>21314 MBKW33</b>	3,12
	2,6	2600	3400	<b>21314 MB</b>	3,2
	2,6	2600	3400	<b>21314 MBW33</b>	3,16
	1,9	2400	3200	<b>22314 C</b>	4,32
	1,9	2400	3200	<b>22314 CK</b>	4,32
	1,9	2400	3200	<b>22314 CKW33</b>	4,21
	1,9	2400	3200	<b>22314 CW33</b>	4,3
	1,7	2200	2800	<b>22314 MBK</b>	4,43
	1,7	2200	2800	<b>22314 MBKW33</b>	4,42
	1,7	2200	2800	<b>22314 MAC4F80W33</b>	4,58
	1,8	2200	2800	<b>22314 MB</b>	4,31
	1,7	2200	2800	<b>22314 MBW33</b>	4,61
	1,7	2200	2800	<b>22314 MBW7</b>	1,90
<b>75</b>	2,9	2800	3800	<b>22215 C</b>	1,91
	2,9	2800	3800	<b>22215 CK</b>	1,88
	2,9	2800	3800	<b>22215 CW33</b>	1,86
	2,9	2800	3800	<b>22215 CKW33</b>	1,86
	2,7	2600	3400	<b>22215 MBK</b>	1,75
	2,7	2600	3400	<b>22215 MBKW33</b>	1,73
	2,7	2600	3400	<b>22215 MB</b>	1,79
	2,7	2600	3400	<b>22215 MBW33</b>	1,77
	2,9	2400	3000	<b>22315 MBKW33</b>	1,73
	2,9	2400	3200	<b>21315 CW33</b>	3,50
	2,9	2400	3200	<b>21315 CKW33</b>	5,28

## Spherical Roller Bearings

### SR 3918



d	D	B	r <sub>s</sub> min.	Basical radial load					stat. C <sub>0r</sub>
				dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>		
mm									
<b>75</b>	160	55	2,1	415	0,38	1,8	2,6	520	
	160	55	2,1	415	0,38	1,8	2,6	520	
	160	55	2,1	415	0,38	1,8	2,6	520	
	160	55	2,1	415	0,38	1,8	2,6	520	
	160	55	2,1	380	0,34	1,9	2,9	475	
	160	55	2,1	380	0,34	1,9	2,9	475	
	160	55	2,1	380	0,34	1,9	2,9	475	
	160	55	2,1	380	0,34	1,9	2,9	475	
	160	55	2,1	380	0,34	1,9	2,9	475	
<b>80</b>	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	210	0,25	2,6	4	275	
	140	33	2	195	0,24	2,8	4,1	250	
	140	33	2	195	0,24	2,8	4,1	250	
	140	33	2	195	0,24	2,8	4,1	250	
	140	33	2	195	0,24	2,8	4,1	250	
	170	39	2,1	310	0,23	2,9	4,2	400	
	170	39	2,1	310	0,23	2,9	4,2	400	
	170	58	2,1	450	0,35	1,9	2,9	550	
	170	58	2,1	450	0,35	1,9	2,9	550	
	170	58	2,1	450	0,35	1,9	2,9	550	
	170	58	2,1	450	0,35	1,9	2,9	550	
	170	58	2,1	410	0,25	2,6	4	500	
	170	58	2,1	410	0,25	2,6	4	500	

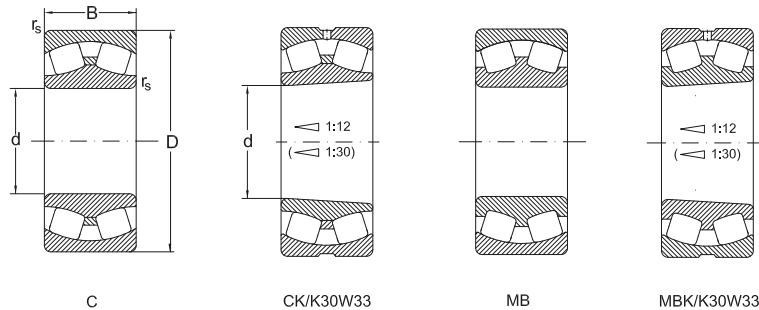
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>75</b>	1,7	2200	3000	<b>22315 C</b>	5,28
	1,7	2200	3000	<b>22315 CW33</b>	5,26
	1,7	2200	3000	<b>22315 CK</b>	5,16
	1,7	2200	3000	<b>22315 CKW33</b>	5,14
	1,9	1900	2600	<b>22315 MBK</b>	5,14
	1,9	1900	2600	<b>22315 MBKW33</b>	5,12
	1,9	1900	2600	<b>22315 MAC4F80W33</b>	5,57
	1,9	1900	2600	<b>22315 MB</b>	5,26
	1,9	1900	2600	<b>22315 MBW33</b>	5,24
<b>80</b>	2,6	2600	3400	<b>22216 C</b>	2,12
	2,6	2600	3400	<b>22216 CW33</b>	2,1
	2,6	2600	3400	<b>22216 CK</b>	2,07
	2,6	2600	3400	<b>22216 CKW33</b>	2,05
	2,6	2600	3400	<b>22216 CY</b>	2,13
	2,6	2600	3400	<b>22216 CYK</b>	2,13
	2,6	2600	3400	<b>22216 CYKW33</b>	2,06
	2,6	2600	3400	<b>22216 CYW33</b>	2,11
	2,7	2400	3200	<b>22216 MBK</b>	2,09
	2,7	2400	3200	<b>22216 MBKW33</b>	2,07
	2,7	2400	3200	<b>22216 MB</b>	2,07
	2,7	2200	3000	<b>22216 MBW33</b>	2,1
	2,8	2200	3000	<b>21316 CW33</b>	4,26
	2,8	2200	3000	<b>21316 CKW33</b>	4,20
	1,8	2000	2600	<b>22316 C</b>	6,29
	1,8	2000	2600	<b>22316 CK</b>	6,14
	1,8	2000	2600	<b>22316 CKW33</b>	6,12
	1,8	2000	2600	<b>22316 CW33</b>	6,27
	2,6	1800	2400	<b>22316 MAC4F80W33</b>	6,95
	2,6	1800	2400	<b>22316 MBK</b>	6,11

## Spherical Roller Bearings SR 3918



d	D	B	$r_s$ min.	Basical radial load					stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>80</b>	170	58	2,1	410	0,25	2,6	4	500	
	170	58	2,1	410	0,25	2,6	4	500	
	170	58	2,1	410	0,25	2,6	4	500	
<b>85</b>	150	36	2	250	0,26	2,6	3,9	325	
	150	36	2	250	0,26	2,6	3,9	325	
	150	36	2	250	0,26	2,6	3,9	325	
	150	36	2	250	0,26	2,6	3,9	325	
	150	36	2	230	0,25	2,7	4	295	
	150	36	2	230	0,25	2,7	4	295	
	150	36	2	230	0,25	2,7	4	295	
	150	36	2	230	0,25	2,7	4	295	
	150	36	2	230	0,25	2,7	4	295	
	150	36	2	230	0,25	2,7	4	295	
	180	41	3	233,4	0,22	3	4,5	244	
	180	41	3	350	0,22	3	4,5	450	
	180	41	3	350	0,22	3	4,5	450	
	180	60	3	500	0,33	2	3	620	
	180	60	3	500	0,33	2	3	620	
	180	60	3	500	0,33	2	3	620	
	180	60	3	407	0,22	3	4,5	507	
	180	60	3	460	0,37	1,8	2,7	570	
	180	60	3	460	0,37	1,8	2,7	570	
	180	60	3	460	0,37	1,8	2,7	570	
	180	60	3	460	0,37	1,8	2,7	570	
	180	60	3	407	0,22	3	4,5	507	
	180	60	3	460	0,37	1,8	2,7	570	

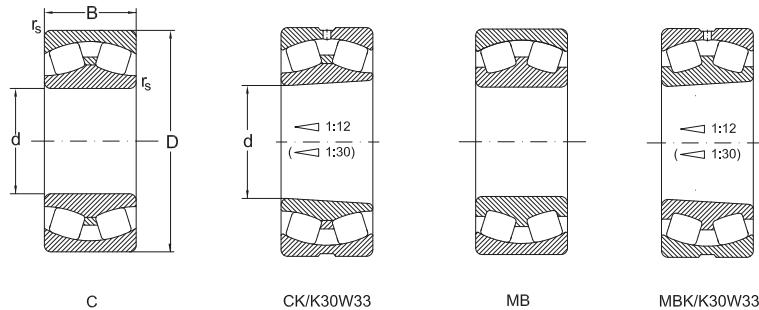
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>80</b>	2,6	1800	2400	<b>22316 MB</b>	6,25
	2,6	1800	2400	<b>22316 MBW33</b>	6,23
	2,6	1800	2400	<b>22316 MBKW33</b>	6,09
<b>85</b>	2,6	2400	3200	<b>22217 C</b>	2,57
	2,6	2400	3200	<b>22217 CK</b>	2,52
	2,6	2400	3200	<b>22217 CW33</b>	2,56
	2,6	2400	3200	<b>22217 CKW33</b>	2,50
	2,6	2200	2800	<b>22217 MB</b>	2,76
	2,6	2200	2800	<b>22217 MBK</b>	2,7
	2,6	2200	2800	<b>22217 MBKW33</b>	2,69
	2,6	2200	2800	<b>22217 MBW7</b>	2,76
	2,6	2200	2800	<b>22217 MBW33</b>	2,75
	2,9	2100	2600	<b>21317 MBKW33</b>	5,78
	2,9	2200	2800	<b>21317 C</b>	5,10
	2,9	2200	2800	<b>21317 CK</b>	5,00
	2	1800	2400	<b>22317 C</b>	7,68
	2	1800	2400	<b>22317 CK</b>	7,52
	2	1800	2400	<b>22317 CKW33</b>	7,47
	2,9	2200	2800	<b>22317 CA</b>	7,64
	1,8	1800	2400	<b>22317 MBW33</b>	7,27
	1,8	1700	2200	<b>22317 MBK</b>	7,07
	1,8	1700	2200	<b>22317 MAC4F80W33</b>	7,88
	1,8	1700	2200	<b>22317 MB</b>	7,23
	1,8	1700	2200	<b>22317 MBW20</b>	7,23
	1,9	2200	2800	<b>22317 CA</b>	7,64
	1,8	1700	2200	<b>22317 MBKW33</b>	7,01

## Spherical Roller Bearings SR 3918



d	D	B	$r_s$ min.	Basical radial load					stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>90</b>	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	305	0,27	2,5	3,8	410	
	160	40	2	280	0,26	2,6	3,8	375	
	160	40	2	280	0,26	2,6	3,8	375	
	160	40	2	280	0,26	2,6	3,8	375	
	160	52,4	2	340	0,34	2	3	485	
	160	52,4	2	340	0,34	2	3	485	
	160	52,4	2	340	0,34	2	3	485	
	160	52,4	2	340	0,34	2	3	485	
	190	43	3	385	0,22	3	4,5	510	
	190	43	3	385	0,22	3	4,5	510	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	570	0,36	1,9	2,8	730	
	190	64	3	530	0,37	1,8	2,7	670	
	190	64	3	530	0,37	1,8	2,7	670	
	190	64	3	530	0,37	1,8	2,7	670	

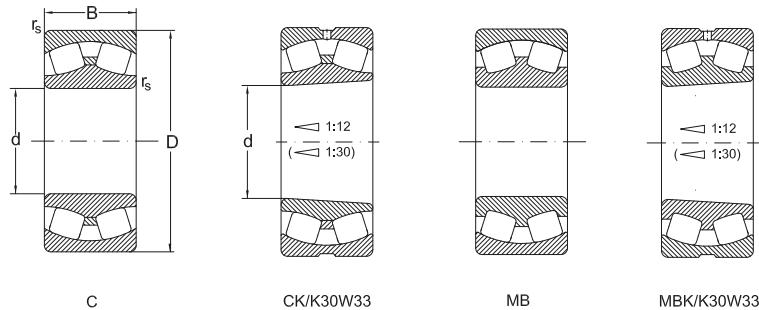
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>90</b>	2,5	2200	3000	<b>22218 C</b>	3,40
	2,5	2200	3000	<b>22218 CW33</b>	3,38
	2,5	2200	3000	<b>22218 CK</b>	3,33
	2,5	2200	3000	<b>22218 CKW33</b>	3,31
	2,5	2200	3000	<b>22218 CY</b>	3,41
	2,5	2200	3000	<b>22218 CYK</b>	3,34
	2,5	2200	3000	<b>22218 CYKW33</b>	3,33
	2,5	2200	3000	<b>22218 CYW33</b>	3,39
	2,5	2200	2800	<b>22218 MBK</b>	3,47
	2,5	2200	2800	<b>22218 MBKW33</b>	3,46
	2,5	2200	2800	<b>22218 MBW33</b>	3,46
	2,5	2200	2800	<b>22218 MB</b>	3,57
	2	1500	2000	<b>23218 MBKW33</b>	4,23
	2	1500	2000	<b>23218 MB</b>	4,37
	2	1500	2000	<b>23218 MBK</b>	4,25
	2	1500	2000	<b>23218 MBW33</b>	4,35
	2,9	2200	2800	<b>21318 C</b>	5,80
	2,9	2200	2800	<b>21318 CK</b>	5,70
	1,8	1800	2400	<b>22318 C</b>	8,52
	1,8	1800	2400	<b>22318 CK</b>	8,68
	1,8	1800	2400	<b>22318 CW33</b>	8,60
	1,8	1800	2400	<b>22318 CKW33</b>	8,50
	1,8	1800	2400	<b>22318 CY</b>	8,73
	1,8	1800	2400	<b>22318 CYK</b>	8,55
	1,8	1800	2400	<b>22318 CYKW33</b>	8,53
	1,8	1800	2400	<b>22318 CYW33</b>	8,71
	1,8	1700	2200	<b>22318 MBK</b>	8,5
	1,8	1700	2200	<b>22318 MBKW33</b>	8,49
	1,8	1700	2200	<b>22318 MA</b>	9,21

## Spherical Roller Bearings SR 3918



d	D	B	r <sub>s</sub> min.	Basical radial load					stat. C <sub>0r</sub>
				dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>		
<b>mm</b>									<b>kN</b>
<b>90</b>	190	64	3	530	0,37	1,8	2,7	670	
	190	64	3	530	0,37	1,8	2,7	670	
	190	64	3	530	0,37	1,8	2,7	670	
<b>95</b>	170	43	2,1	340	0,24	2,8	4,2	450	
	170	43	2,1	340	0,24	2,8	4,2	450	
	170	43	2,1	340	0,24	2,8	4,2	450	
	170	43	2,1	340	0,24	2,8	4,2	450	
	170	43	2,1	340	0,24	2,8	4,2	450	
	170	43	2,1	310	0,26	2,6	3,8	415	
	170	43	2,1	310	0,26	2,6	3,8	415	
	170	43	2,1	310	0,26	2,6	3,8	415	
	170	43	2,1	310	0,26	2,6	3,8	415	
	170	43	2,1	310	0,26	2,6	3,8	415	
	200	45	3	420	0,22	3	4,5	580	
	200	45	3	385	0,22	3,1	4,6	530	
	200	45	3	385	0,22	3,1	4,6	530	
	200	67	3	620	0,35	1,9	2,9	800	
	200	67	3	620	0,35	1,9	2,9	800	
	200	67	3	620	0,35	1,9	2,9	800	
	200	67	3	620	0,35	1,9	2,9	800	
	200	67	3	570	0,35	1,9	2,7	740	
	200	67	3	570	0,38	1,8	2,7	740	
	200	67	3	570	0,38	1,8	2,7	740	
	200	67	3	570	0,38	1,8	2,7	740	
	200	67	3	570	0,38	1,8	2,7	740	
<b>100</b>	165	52	2	347	0,28	2,4	3,5	534	

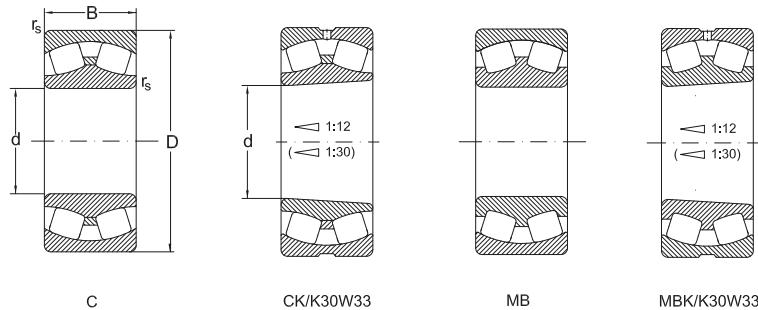
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
90	1,8	1700	2200	<b>22318 MAC4F80W33</b>	9,2
	1,8	1700	2200	<b>22318 MB</b>	8,69
	1,8	1700	2200	<b>22318 MBW33</b>	8,68
95	2,8	2200	2800	<b>22219 C</b>	4,26
	2,8	2200	2800	<b>22219 CK</b>	4,17
	2,8	2200	2800	<b>22219 CKW33</b>	4,15
	2,8	2200	2800	<b>22219 CW25</b>	4,24
	2,8	2200	2800	<b>22219 CW33</b>	4,24
	2,5	2000	2600	<b>22219 MBK</b>	4,3
	2,5	2000	2600	<b>22219 MBKW33</b>	4,28
	2,5	2000	2600	<b>22219 MB</b>	4,32
	2,5	2000	2600	<b>22219 MBW25</b>	4,32
	2,5	2600	2600	<b>22319 MBW33</b>	4,28
	3	2600	2600	<b>21319 CA</b>	7,43
	3	2400	2400	<b>21319 MB</b>	7,38
	3	2400	2400	<b>21319 MBK</b>	7,28
	1,8	2200	2200	<b>22319 C</b>	8,83
	1,8	2200	2200	<b>22319 CK</b>	8,61
	1,8	2200	2200	<b>22319 CKW33</b>	8,5
	1,8	2200	2200	<b>22319 CW25</b>	8,71
	1,8	2200	2200	<b>22319 CW33</b>	8,72
	1,7	2000	2000	<b>22319 MBK</b>	9,88
	1,7	2000	2000	<b>22319 MAC4F80W33</b>	10,7
	1,7	2000	2000	<b>22319 MB</b>	10,1
	1,7	2000	2000	<b>22319 MBW25</b>	9,97
	1,7	2000	2000	<b>22319 MBW33</b>	9,97
	1,7	2000	2000	<b>22319 MBKW33</b>	9,97
100	2,3	2200	3000	<b>23120 CW33</b>	5

## Spherical Roller Bearings SR 3918



d	D	B	$r_s$ min.	Basical radial load					stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>100</b>	165	52	2	355	0,31	2,2	3,2	540	
	165	52	2	355	0,31	2,2	3,2	540	
	165	52	2	355	0,31	2,2	3,2	540	
	165	52	2	355	0,31	2,2	3,2	540	
	180	46	2,1	375	0,24	2,8	4,2	500	
	180	46	2,1	375	0,24	2,8	4,2	500	
	180	46	2,1	375	0,24	2,8	4,2	500	
	180	46	2,1	375	0,24	2,8	4,2	500	
	180	46	2,1	340	0,27	2,5	3,7	455	
	180	46	2,1	340	0,27	2,5	3,7	455	
	180	46	2,1	340	0,27	2,5	3,7	455	
	180	46	2,1	340	0,27	2,5	3,7	455	
	180	60,3	2,1	495	0,33	2	3	720	
	180	60,3	2,1	495	0,33	2	3	720	
	180	60,3	2,1	495	0,33	2	3	720	
	180	60,3	2,1	495	0,33	2	3	720	
	180	60,3	2,1	455	0,33	2	3	660	
	180	60,3	2,1	455	0,33	2	3	660	
	180	60,3	2,1	455	0,33	2	3	660	
	180	60,3	2,1	455	0,33	2	3	660	
	180	60,3	2,1	455	0,33	2	3	660	
	215	47	3	460	0,22	3,1	4,7	640	
	215	47	3	371	0,24	2,8	4,2	410	
	215	47	3	425	0,22	3,1	4,7	580	
	215	73	3	730	0,35	1,9	2,9	960	
	215	73	3	730	0,35	1,9	2,9	960	
	215	73	3	730	0,35	1,9	2,9	960	

## Spherical Roller Bearings

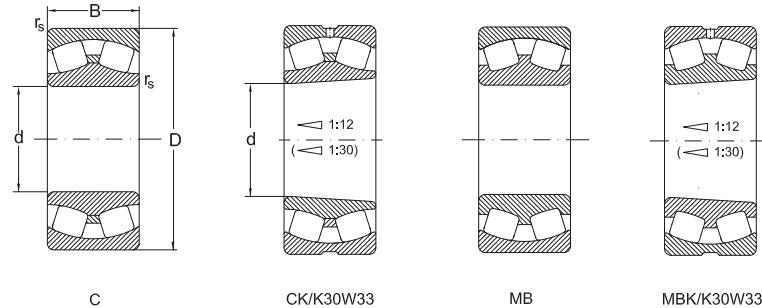
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>100</b>	2,1	2000	2600	<b>23120 MBKW33</b>	4,53
	2,1	2000	2600	<b>23120 MB</b>	4,7
	2,1	2000	2600	<b>23120 MBK</b>	4,57
	2,1	2000	2600	<b>23120 MBW33</b>	4,66
	2,8	2200	2800	<b>22220 C</b>	5,24
	2,8	2200	2800	<b>22220 CK</b>	5,13
	2,8	2200	2800	<b>22220 CKW33</b>	5,09
	2,8	2200	2800	<b>22220 CW33</b>	5,24
	2,4	2000	2600	<b>22220 MBK</b>	5,24
	2,4	2000	2600	<b>22220 MB</b>	5,35
	2,4	2000	2600	<b>22220 MBW33</b>	5,31
	2,4	2000	2600	<b>22220 MBKW33</b>	5,2
	2	1700	2200	<b>23220 C</b>	7,34
	2	1700	2200	<b>23220 CK</b>	7,19
	2	1700	2200	<b>23220 CKW33</b>	7,13
	2	1700	2200	<b>23220 CW33</b>	7,28
	2	1500	2000	<b>23220 MA</b>	7,04
	2	1500	2000	<b>23220 MAK</b>	6,85
	2	1500	2000	<b>23220 MAW33</b>	7,03
	2	1500	2000	<b>23220 MAKW33</b>	6,84
	2	1500	2000	<b>23220 MBK</b>	6,80
	2	1500	2000	<b>23220 MB</b>	6,99
	2	1500	2000	<b>23220 MBW33</b>	6,98
<b>120</b>	3,1	1800	2400	<b>21320 CA</b>	9,07
	2,8	1700	2200	<b>21320 MB</b>	8,96
	3,1	1700	2200	<b>21320 MBK</b>	8,84
	1,9	1500	2000	<b>22320 C</b>	12,95
	1,9	1500	2000	<b>22320 CK</b>	12,67
	1,9	1500	2000	<b>22320 CW33</b>	12,83

## Spherical Roller Bearings

### SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	r_s min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>100</b>	215	73	3	730	0,35	1,9	2,9	960	
	215	73	3	730	0,35	1,9	2,9	960	
	215	73	3	670	0,37	1,8	2,9	880	
	215	73	3	670	0,37	1,8	2,9	880	
	215	73	3	670	0,37	1,8	2,9	880	
	215	73	3	670	0,37	1,8	2,9	880	
	215	73	3	670	0,37	1,8	2,7	880	
	215	73	3	670	0,37	1,8	2,7	880	
<b>110</b>	170	45	2	295	0,24	2,8	4,2	485	
	170	45	2	295	0,24	2,8	4,2	485	
	170	45	2	295	0,24	2,8	4,2	485	
	170	45	2	295	0,24	2,8	4,2	485	
	180	56	2	450	0,3	2,3	3,4	700	
	180	56	2	410	0,3	2,3	3,3	640	
	180	56	2	410	0,3	2,3	3,3	640	
	180	56	2	410	0,3	2,3	3,3	640	
	180	69	2	466	0,39	1,7	2,6	771	
	180	69	2	466	0,39	1,7	2,6	771	
	180	69	2	466	0,39	1,7	2,6	771	
	200	53	2,1	515	0,25	2,7	4	650	
	200	53	2,1	515	0,25	2,7	4	650	
	200	53	2,1	515	0,25	2,7	4	650	
	200	53	2,1	515	0,25	2,7	4	650	
	200	53	2,1	455	0,28	2,4	3,5	585	
	200	53	2,1	455	0,28	2,4	3,5	585	
	200	53	2,1	455	0,28	2,4	3,5	585	
	200	53	2,1	455	0,28	2,4	3,5	585	

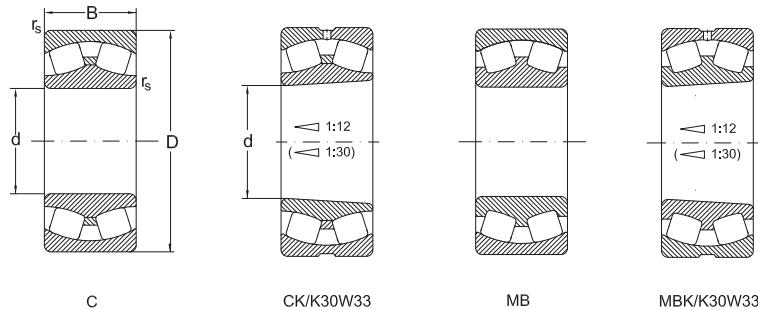
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>100</b>	1,9	1500	2000	<b>22320 CKW33</b>	12,55
	1,9	1500	2000	<b>22320 CYW33</b>	12,83
	1,7	1400	1800	<b>22320 MBK</b>	13,21
	1,7	1400	1800	<b>22320 MBKW33</b>	13,09
	1,7	1400	1800	<b>22320 MA</b>	13,89
	1,7	1400	1800	<b>22320 MAC4F80W33</b>	13,78
	1,7	1400	1800	<b>22320 MB</b>	13,49
	1,7	1400	1800	<b>22320 MBW33</b>	13,37
<b>110</b>	2,7	2000	2600	<b>23022 MBK</b>	3,58
	2,7	2000	2600	<b>23022 MBKW33</b>	3,56
	2,7	2000	2600	<b>23022 MB</b>	3,8
	2,7	2000	2600	<b>23022 MBW33</b>	3,56
	2,2	2000	2600	<b>23122 C</b>	6,26
	2,2	1800	2400	<b>23122 MBK</b>	5,18
	2,2	1800	2400	<b>23122 MB</b>	5,29
	2,2	1800	2400	<b>23122 MBW33</b>	5,19
	2,2	1800	2400	<b>23122 MBKW33</b>	5,07
	1,7	1200	1600	<b>24122 CA</b>	6,82
	1,7	1200	1600	<b>24122 CAW33</b>	6,9
	1,7	1200	1600	<b>24122 CAK30</b>	6,9
	1,7	1200	1600	<b>24122 CAK30W33</b>	6,80
	2,5	1800	2400	<b>22222 C</b>	7,45
	2,5	1800	2400	<b>22222 CK</b>	7,45
	2,5	1800	2400	<b>22222 CKW33</b>	7,45
	2,5	1800	2400	<b>22222 CW33</b>	7,45
	2,3	1700	2200	<b>22222 MBK</b>	7,58
	2,3	1700	2200	<b>22222 MB</b>	7,10
	2,3	1700	2200	<b>22222 MBW33</b>	7
	2,3	1700	2200	<b>22222 MBKW33</b>	7,1

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>110</b>	200	69,8	2,1	620	0,33	2	3	920	
	200	69,8	2,1	570	0,37	1,8	2,7	840	
	200	69,8	2,1	570	0,37	1,8	2,7	840	
	200	69,8	2,1	570	0,37	1,8	2,7	840	
	200	69,8	2,1	570	0,37	1,8	2,7	840	
	200	69,8	2,1	570	0,37	1,8	2,7	840	
	240	50	3	510	0,21	3,2	4,8	690	
	240	50	3	510	0,21	3,2	4,8	690	
	240	80	3	870	0,34	1,2	2,3	1160	
	240	80	3	870	0,34	1,2	2,3	1160	
	240	80	3	870	0,34	1,2	2,3	1160	
	240	80	3	870	0,34	1,2	2,3	1160	
	240	80	3	870	0,34	2	3	1160	
	240	80	3	870	0,34	2	3	1160	
	240	80	3	800	0,37	1,8	2,7	1060	
	240	80	3	800	0,37	1,8	2,7	1060	
	240	80	3	800	0,37	1,8	2,7	1060	
	240	80	3	800	0,37	1,8	2,7	1060	
	240	80	3	800	0,37	1,8	2,7	1060	
	240	80	3	800	0,37	1,8	2,7	1060	
<b>120</b>	180	46	2	365	0,22	3	4,6	610	
	180	46	2	365	0,22	3	4,6	610	
	180	46	2	365	0,22	3	4,6	610	
	180	46	2	365	0,22	3	4,6	610	
	180	46	2	335	0,24	2,8	4,2	560	
	180	46	2	335	0,24	2,8	4,2	560	
	180	46	2	335	0,24	2,8	4,2	560	
	180	46	2	335	0,24	2,8	4,2	560	

## Spherical Roller Bearings

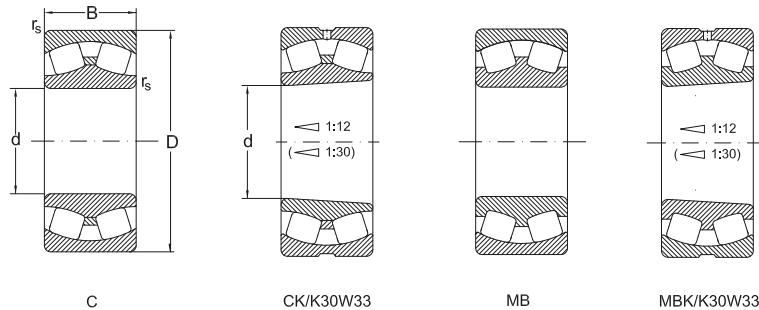
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>110</b>	2	1400	1800	<b>23222 C</b>	10,75
	1,8	1200	1600	<b>23222 MBK</b>	9,40
	1,8	1200	1600	<b>23222 MB</b>	9,70
	1,8	1200	1600	<b>23222 MBW20</b>	9,40
	1,8	1200	1600	<b>23222 MBW33</b>	9,70
	1,8	1200	1600	<b>23222 MBKW33</b>	9,50
	3,2	1500	2000	<b>21322 MB</b>	12,0
	3,2	1500	2000	<b>21322 MBK</b>	11,7
	1,2	1400	1900	<b>22322 C</b>	18,0
	1,2	1400	1900	<b>22322 CW33</b>	18,0
	1,2	1400	1900	<b>22322 CK</b>	17,5
	1,2	1400	1900	<b>22322 CKW33</b>	17,5
	2	1400	1900	<b>22322 CY</b>	17,5
	2	1400	1900	<b>22322 CYK</b>	17,5
	1,8	1300	1700	<b>22322 MBK</b>	18,7
	1,8	1300	1700	<b>22322 MBKW33</b>	18,7
	1,8	1300	1700	<b>22322 MB</b>	17,7
	1,8	1300	1700	<b>22322 MBW33</b>	18,7
	1,8	1300	1700	<b>22322 MA</b>	18,4
	1,8	1300	1700	<b>22322 MAC4F80W33</b>	18,7
	1,8	1300	1700	<b>22322 MAW33</b>	18,7
<b>120</b>	2,8	2000	2600	<b>23024 C</b>	4,31
	2,8	2000	2600	<b>23024 CK</b>	4,11
	2,8	2000	2600	<b>23024 CKW33</b>	4,09
	2,8	2000	2600	<b>23024 CW33</b>	4,22
	2,8	1800	2400	<b>23024 MBK</b>	4,19
	2,8	1800	2400	<b>23024 MB</b>	4,19
	2,8	1800	2400	<b>23024 MBW33</b>	4,14
	2,8	1800	2400	<b>23024 MBKW33</b>	3,87

## Spherical Roller Bearings

### SR 3918



d	D	B	r <sub>s</sub> min.	Basical radial load					stat. C <sub>0r</sub>
				dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>		
<b>mm</b>									<b>kN</b>
<b>120</b>	180	60	2	450	0,32	2,1	3,1	800	
	180	60	2	450	0,32	2,1	3,1	800	
	180	60	2	410	0,32	2,1	3,1	740	
	180	60	2	410	0,32	2,1	3,1	740	
	180	60	2	410	0,32	2,1	3,1	740	
	200	62	2	495	0,31	2,2	3,3	770	
	200	62	2	495	0,31	2,2	3,3	770	
	200	62	2	495	0,31	2,2	3,3	770	
	200	80	2	630	0,4	1,7	2,5	1050	
	200	80	2	630	0,4	1,7	2,5	1050	
	200	80	2	630	0,4	1,7	2,5	1050	
	215	58	2,1	590	0,27	2,6	3,8	800	
	215	58	2,1	590	0,27	2,6	3,8	800	
	215	58	2,1	590	0,27	2,6	3,8	800	
	215	58	2,1	590	0,27	2,6	3,8	800	
	215	58	2,1	540	0,29	2,3	3,5	740	
	215	58	2,1	540	0,29	2,3	3,5	740	
	215	58	2,1	540	0,29	2,3	3,5	740	
	215	58	2,1	540	0,29	2,3	3,5	740	
	215	76	2,1	730	0,35	1,9	2,9	1120	
	215	76	2,1	670	0,37	1,8	2,7	1020	
	215	76	2,1	670	0,37	1,8	2,7	1020	
	215	76	2,1	670	0,37	1,8	2,7	1020	
	260	86	3	1010	0,35	1,9	2,9	1340	
	260	86	3	1010	0,35	1,9	2,9	1340	
	260	86	3	1010	0,35	1,9	2,9	1340	
	260	86	3	1010	0,35	1,9	2,9	1340	

## Spherical Roller Bearings

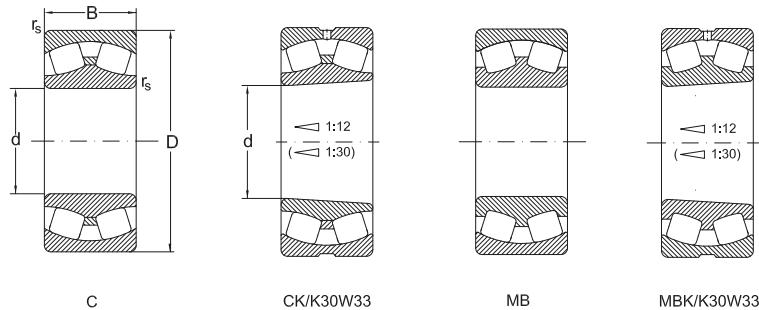
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
120	2	1500	2000	<b>24024 CAW33</b>	5,40
	2	1500	2000	<b>24024 CAK30W33</b>	5,30
	2	1400	1800	<b>24024 MBK30W33</b>	5,1
	2	1400	1800	<b>24024 MB</b>	5,12
	2	1400	1800	<b>24024 MBW33</b>	5,1
	2,2	1700	2200	<b>23124 MBK</b>	7,9
	2,2	1700	2200	<b>23124 MB</b>	8,19
	2,2	1700	2200	<b>23124 MBW33</b>	8,13
	2,2	1700	2200	<b>23124 MBKW33</b>	7,84
	1,6	1000	1300	<b>24124 MB</b>	10,22
	1,6	1000	1300	<b>24124 MBW33</b>	10,2
	1,6	1000	1300	<b>24124 MBK30W33</b>	10,04
	2,5	1700	2200	<b>22224 C</b>	8,9
	2,5	1700	2200	<b>22224 CK</b>	8,70
	2,5	1700	2200	<b>22224 CW33</b>	8,8
	2,5	1700	2200	<b>22224 CKW33</b>	8,60
	2,3	1500	2000	<b>22224 MBK</b>	9,53
	2,3	1500	2000	<b>22224 MBKW33</b>	9,09
	2,3	1500	2000	<b>22224 MB</b>	9,04
	2,3	1500	2000	<b>22224 MBW33</b>	9,73
1,8	1300	1700		<b>23224 C</b>	13,1
	1,8	1100	1500	<b>23224 MBK</b>	11,84
	1,8	1100	1500	<b>23224 MB</b>	12,8
	1,8	1100	1500	<b>23224 MBW33</b>	11,73
	1,8	1100	1500	<b>23224 MBKW33</b>	11,73
	1,8	1300	1700	<b>22324 C</b>	23,76
	1,8	1300	1700	<b>22324 CK</b>	23,29
	1,8	1300	1700	<b>22324 CKW33</b>	23,05
	1,8	1300	1700	<b>22324 CW33</b>	23,52

## Spherical Roller Bearings

### SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>120</b>	260	86	3	930	0,36	1,8	2,7	1230	
	260	86	3	930	0,36	1,8	2,7	1230	
	260	86	3	930	0,36	1,8	2,7	1230	
	260	86	3	930	0,36	1,8	2,7	1230	
	260	86	3	930	0,36	1,8	2,7	1230	
	260	86	3	930	0,36	1,8	2,7	1230	
<b>130</b>	200	52	2	450	0,23	2,9	4,4	730	
	200	52	2	450	0,23	2,9	4,4	730	
	200	52	2	450	0,23	2,9	4,4	730	
	200	52	2	450	0,23	2,9	4,4	730	
	200	52	2	410	0,23	2,9	4,4	670	
	200	52	2	410	0,23	2,9	4,4	670	
	200	52	2	410	0,23	2,9	4,4	670	
	200	52	2	410	0,23	2,9	4,4	670	
	200	69	2	530	0,34	2	3	900	
	200	69	2	530	0,34	2	3	900	
	200	69	2	530	0,34	2	3	900	
	210	64	2	590	0,28	2,4	3,6	940	
	210	64	2	540	0,3	2,3	3,3	860	
	210	64	2	540	0,3	2,3	3,3	860	
	210	64	2	540	0,3	2,3	3,3	860	
	210	64	2	540	0,3	2,3	3,3	860	
	210	80	2	650	0,37	1,8	2,7	1100	
	210	80	2	650	0,37	1,8	2,7	1100	
	210	80	2	650	0,37	1,8	2,7	1100	
	230	64	3	660	0,29	2,3	3,5	960	
	230	64	3	660	0,29	2,3	3,5	960	
	230	64	3	660	0,29	2,3	3,5	960	
	230	64	3	660	0,29	2,3	3,5	960	

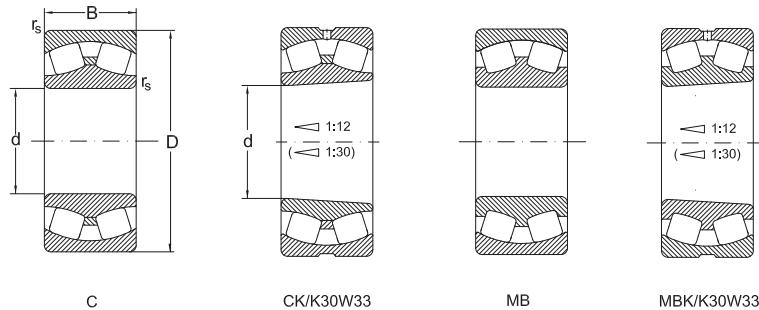
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>120</b>	1,8	1100	1500	<b>22324 MAKC4F80W33</b>	23,93
	1,8	1100	1500	<b>22324 MBK</b>	22,93
	1,8	1100	1500	<b>22324 MAC4F80W33</b>	23,93
	1,8	1100	1500	<b>22324 MB</b>	23,39
	1,8	1100	1500	<b>22324 MBW33</b>	23,18
	1,8	1100	1500	<b>22324 MBKW33</b>	22,71
<b>130</b>	2,8	1800	2400	<b>23026 C</b>	4,59
	2,8	1800	2400	<b>23026 CK</b>	5,99
	2,8	1800	2400	<b>23026 CKW33</b>	5,94
	2,8	1800	2400	<b>23026 CW33</b>	6,09
	2,8	1700	2200	<b>23026 MBK</b>	5,61
	2,8	1700	2200	<b>23026 MB</b>	5,78
	2,8	1700	2200	<b>23026 MBW33</b>	5,73
	2,8	1700	2200	<b>23026 MBKW33</b>	5,56
	1,9	1200	1600	<b>24026 MB</b>	7,98
	1,9	1200	1600	<b>24026 MBW33</b>	7,79
	1,9	1200	1600	<b>24026 MBK30W33</b>	7,78
	2,5	1700	2200	<b>23126 C</b>	9,70
	2,2	1500	2000	<b>23126 MBK</b>	8,36
	2,2	1500	2000	<b>23126 MB</b>	8,66
	2,2	1500	2000	<b>23126 MBW33</b>	8,62
	2,2	1500	2000	<b>23126 MBKW33</b>	8,32
	1,8	900	1200	<b>24126 MB</b>	11,09
	1,8	900	1200	<b>24126 MBW33</b>	11,06
	1,8	900	1200	<b>24126 MBK30W33</b>	11,09
	2,3	1700	2200	<b>22226 C</b>	11,14
	2,3	1700	2200	<b>22226 CW33</b>	10,01
	2,3	1700	2200	<b>22226 CK</b>	10,87
	2,3	1700	2200	<b>22226 CKW33</b>	10,7

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
		mm							kN
<b>130</b>	230	64	3	660	0,29	2,3	3,5	960	
	230	64	3	660	0,29	2,3	3,5	960	
	230	64	3	660	0,29	2,3	3,5	960	
	230	64	3	600	0,29	2,3	3,4	880	
	230	64	3	600	0,29	2,3	3,4	880	
	230	64	3	600	0,29	2,3	3,4	880	
	230	64	3	600	0,29	2,3	3,4	880	
	230	80	3	830	0,33	2	3	1270	
	230	80	3	760	0,35	1,9	2,8	1170	
	230	80	3	760	0,35	1,9	2,8	1170	
	230	80	3	760	0,35	1,9	2,8	1170	
	280	93	4	1170	0,35	1,9	2,9	1580	
	280	93	4	1170	0,35	1,9	2,9	1580	
	280	93	4	1170	0,35	1,9	2,9	1580	
	280	93	4	1170	0,35	1,9	2,9	1580	
	280	93	4	1080	0,37	1,8	2,7	1450	
	280	93	4	1080	0,37	1,8	2,7	1450	
	280	93	4	1080	0,37	1,8	2,7	1450	
	280	93	4	1080	0,37	1,8	2,7	1450	
<b>140</b>	210	53	2	475	0,22	3	4,6	820	
	210	53	2	475	0,22	3	4,6	820	
	210	53	2	475	0,22	3	4,6	820	
	210	53	2	475	0,22	3	4,6	820	
	210	53	2	435	0,22	3	4,6	750	
	210	53	2	435	0,22	3	4,6	750	
	210	53	2	435	0,22	3	4,6	750	

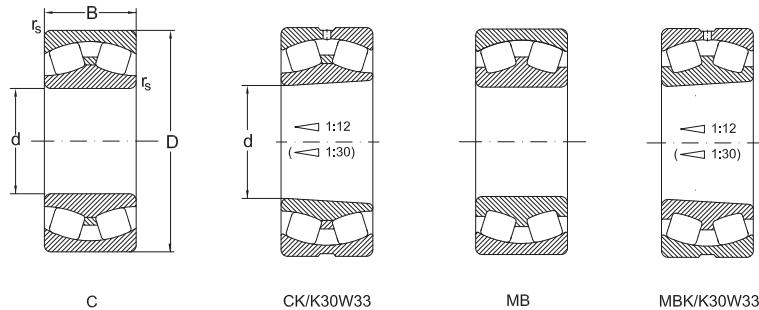
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>130</b>	2,3	1700	2200	<b>22226 CY</b>	11,19
	2,3	1700	2200	<b>22226 CYK</b>	10,92
	2,3	1700	2200	<b>22226 CYW33</b>	11,06
	2,2	1500	2000	<b>22226 MBK</b>	11,32
	2,2	1500	2000	<b>22226 MBKW33</b>	11,2
	2,2	1500	2000	<b>22226 MBW33</b>	11,47
	2,2	1500	2000	<b>22226 MBK</b>	11,32
	2	1300	1700	<b>23226 C</b>	15,86
	1,9	1100	1500	<b>23226 MBK</b>	14,52
	1,9	1100	1500	<b>23226 MB</b>	14,97
	1,9	1100	1500	<b>23226 MBW33</b>	14,95
	1,9	1100	1500	<b>23226 MBKW33</b>	14,5
	1,8	1200	1600	<b>22326 C</b>	34,2
	1,8	1200	1600	<b>22326 CK</b>	28,65
	1,8	1200	1600	<b>22326 CKW33</b>	28,33
	1,8	1200	1600	<b>22326 CW33</b>	28,82
	1,8	1200	1600	<b>22326 CYW502</b>	28,97
	1,8	1100	1400	<b>22326 MBK</b>	28,77
	1,8	1100	1400	<b>22326 MAC4F80W33</b>	29,48
	1,8	1100	1400	<b>22326 MB</b>	28,59
	1,8	1100	1400	<b>22326 MBW33</b>	28,25
	1,8	1100	1400	<b>22326 MBKW33</b>	27,65
<b>140</b>	2,8	1700	2200	<b>23028 C</b>	7,20
	2,8	1700	2200	<b>23028 CK</b>	7,03
	2,8	1700	2200	<b>23028 CKW33</b>	6,96
	2,8	1700	2200	<b>23028 CW33</b>	7,13
	2,8	1500	2000	<b>23028 MBK</b>	6,07
	2,8	1500	2000	<b>23028 MB</b>	6,18
	2,8	1500	2000	<b>23028 MBW33</b>	6,08

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm		kN							
<b>140</b>	210	53	2	435	0,22	3	4,6	750	
	210	69	2	550	0,32	2,1	3,1	990	
	210	69	2	550	0,32	2,1	3,1	990	
	225	68	2,1	660	0,28	2,4	3,6	1080	
	225	68	2,1	600	0,3	2,3	3,3	990	
	225	68	2,1	600	0,3	2,3	3,3	990	
	225	68	2,1	600	0,3	2,3	3,3	990	
	225	68	2,1	600	0,3	2,3	3,3	990	
	225	85	2,1	740	0,37	1,8	2,7	1280	
	225	85	2,1	740	0,37	1,8	2,7	1280	
	225	85	2,1	740	0,37	1,8	2,7	1280	
	250	68	3	730	0,26	2,6	3,9	1080	
	250	68	3	730	0,26	2,6	3,9	1080	
	250	68	3	730	0,26	2,6	3,9	1080	
	250	68	3	730	0,26	2,6	3,9	1080	
	250	68	3	670	0,29	2,3	3,5	990	
	250	68	3	670	0,29	2,3	3,5	990	
	250	68	3	670	0,29	2,3	3,5	990	
	250	68	3	670	0,29	2,3	3,5	990	
	250	68	3	670	0,29	2,3	3,5	990	
	250	88	3	960	0,33	2	3	1500	
	250	88	3	880	0,37	1,8	2,7	1380	
	250	88	3	880	0,37	1,8	2,7	1380	
	250	88	3	880	0,37	1,8	2,7	1380	
	300	102	4	1360	0,35	1,9	2,9	1870	
	300	102	4	1360	0,35	1,9	2,9	1870	
	300	102	4	1360	0,35	1,9	2,9	1870	

## Spherical Roller Bearings

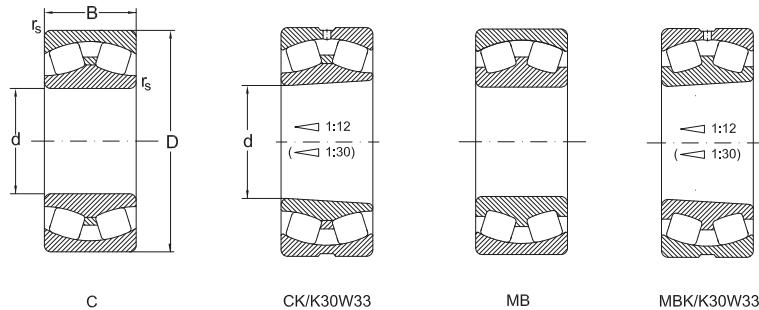
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
140	2,8	1500	2000	<b>23028 MBKW33</b>	5,98
	2,1	1100	1500	<b>24028 MBW33</b>	9,07
	2,1	1100	1500	<b>24028 MBK30W33</b>	8,66
	2,5	1500	2000	<b>23128 C</b>	11,8
	2,2	1400	1800	<b>23128 MBK</b>	10,38
	2,2	1400	1800	<b>23128 MB</b>	10,72
	2,2	1400	1800	<b>23128 MBW33</b>	10,69
	2,2	1400	1800	<b>23128 MBKW33</b>	10,36
	1,8	850	1100	<b>24128 MB</b>	13,27
	1,8	850	1100	<b>24128 MBW33</b>	13,2
	1,8	850	1100	<b>24128 MBK30W33</b>	13,19
	2,5	1400	1900	<b>22228 C</b>	14,4
	2,5	1400	1900	<b>22228 CK</b>	14,09
	2,5	1400	1900	<b>22228 CKW33</b>	13,97
	2,5	1400	1900	<b>22228 CW33</b>	14,27
	2,3	1300	1700	<b>22228 MBK</b>	14,2
	2,3	1300	1700	<b>22228 MBKW33</b>	13,97
	2,3	1300	1700	<b>22228 MB</b>	14,5
	2,3	1300	1700	<b>22228 MBW33</b>	14,27
	2,3	1300	1700	<b>22228 MBKW33</b>	13,97
	2	1100	1400	<b>23228 C</b>	20,86
	1,8	1000	1300	<b>23228 MBK</b>	18,72
	1,8	1000	1300	<b>23228 MB</b>	19,32
	1,8	1000	1300	<b>23228 MBW33</b>	19,19
	1,8	1000	1300	<b>23228 MBKW33</b>	18,59
	1,8	1100	1400	<b>22328 C</b>	45,7
	1,8	1100	1400	<b>22328 CK</b>	36,34
	1,8	1100	1400	<b>22328 CKW33</b>	36,13

## Spherical Roller Bearings

### SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>140</b>	300	102	4	1360	0,35	1,19	2,9	1870	
	300	102	4	1240	0,38	1,7	2,6	1720	
	300	102	4	1240	0,38	1,7	2,6	1720	
	300	102	4	1240	0,38	1,7	2,6	1720	
	300	102	4	1240	0,38	1,7	2,6	1720	
	300	102	4	1240	0,38	1,7	2,6	1720	
	300	118	4	1200	0,43	1,6	2,3	1700	
<b>150</b>	225	56	2,1	520	0,22	3	4,6	900	
	225	56	2,1	520	0,22	3	4,6	900	
	225	56	2,1	520	0,22	3	4,6	900	
	225	56	2,1	520	0,22	3	4,6	900	
	225	56	2,1	480	0,22	3	4,6	830	
	225	56	2,1	480	0,22	3	4,6	830	
	225	56	2,1	480	0,22	3	4,6	830	
	225	56	2,1	480	0,22	3	4,6	830	
	225	75	2,1	620	0,33	2,1	3,1	1140	
	225	75	2,1	620	0,33	2,1	3,1	1140	
	225	75	2,1	620	0,33	2,1	3,1	1140	
	225	75	2,1	620	0,33	2,1	3,1	1140	
	250	100	2,1	1080	0,37	1,8	2,7	1840	
	250	100	2,1	1080	0,4	1,7	2,5	1840	
	250	100	2,1	1080	0,4	1,7	2,5	1840	
	250	100	2,1	1080	0,4	1,7	2,5	1840	
	250	100	2,1	818	0,4	2,1	2,5	1357	
	250	80	2,1	800	0,32	2,1	3,2	1320	
	250	80	2,1	800	0,32	2,1	3,2	1320	
	250	80	2,1	800	0,32	2,1	3,2	1320	

## Spherical Roller Bearings

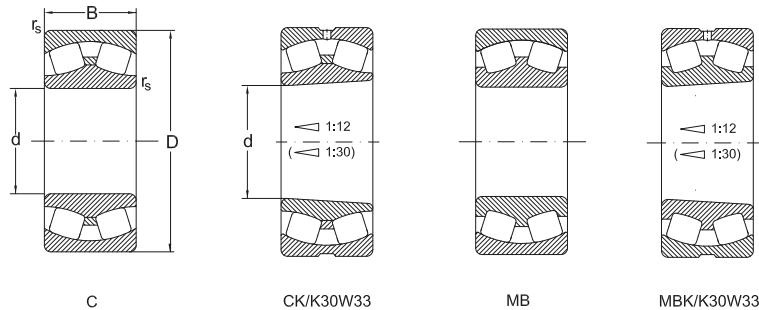
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>140</b>	1,8	1100	1400	<b>22328 CW33</b>	36,79
	1,7	1000	1300	<b>22328 MBK</b>	34,57
	1,7	1000	1300	<b>22328 MAC4F80W33</b>	37,5
	1,7	1000	1300	<b>22328 MB</b>	35,37
	1,7	1000	1300	<b>22328 MBW33</b>	35,17
	1,7	1000	1300	<b>22328 MBKW33</b>	34,37
	1,5	1100	1500	<b>23328 MAC4F80W33</b>	42,23
<b>150</b>	2,8	1500	2000	<b>23030 C</b>	8,57
	2,8	1500	2000	<b>23030 CK</b>	8,4
	2,8	1500	2000	<b>23030 CKW33</b>	8,32
	2,8	1500	2000	<b>23030 CW33</b>	8,51
	2,8	1400	1800	<b>23030 MBK</b>	8,05
	2,8	1400	1800	<b>23030 MB</b>	8,15
	2,8	1400	1800	<b>23030 MBW33</b>	8,11
	2,8	1400	1800	<b>23030 MBKW33</b>	8,05
	2	1100	1400	<b>24030 MBK30</b>	10,1
	2	1100	1400	<b>24030 MB</b>	10,25
	2	1100	1400	<b>24030 MBW33</b>	10,14
	2	1100	1400	<b>24030 MBK30W33</b>	9,97
	1,8	850	1100	<b>24130 C</b>	19,4
	1,6	850	1100	<b>24130 CA</b>	19,66
	1,6	850	1100	<b>24130 CAK30</b>	18,9
	1,6	850	1100	<b>24130 CAW33</b>	19,5
	1,6	850	1100	<b>24130 CAK30W33</b>	18,76
	1,6	750	1000	<b>24130 MBW33</b>	19,97
	2,1	1300	1700	<b>23130 MBK</b>	16
	2,1	1300	1700	<b>23130 MB</b>	16,37
	2,1	1300	1700	<b>23130 MBW33</b>	16,3

## Spherical Roller Bearings

### SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>150</b>	250	80	2,1	800	0,32	2,1	3,2	1320	
	270	73	3	880	0,26	2,6	3,9	1300	
	270	73	3	880	0,26	2,6	3,9	1300	
	270	73	3	880	0,26	2,6	3,9	1300	
	270	73	3	880	0,26	2,6	3,9	1300	
	270	73	3	810	0,29	2,3	3,5	1190	
	270	73	3	810	0,29	2,3	3,5	1190	
	270	73	3	810	0,29	2,3	3,5	1190	
	270	96	3	1030	0,38	1,8	2,7	1610	
	270	96	3	1030	0,38	1,8	2,7	1610	
	270	96	3	1030	0,38	1,8	2,7	1610	
	270	96	3	1030	0,38	1,8	2,7	1610	
	320	108	4	1520	0,35	1,9	2,9	2110	
	320	108	4	1520	0,35	1,9	2,9	2110	
	320	108	4	1520	0,35	1,9	2,9	2110	
	320	108	4	1520	0,35	1,9	2,9	2110	
	320	108	4	1400	0,38	1,7	2,6	1940	
	320	108	4	1400	0,38	1,7	2,6	1940	
	320	108	4	1400	0,38	1,7	2,6	1940	
	320	108	4	1400	0,38	1,7	2,6	1940	
	320	108	4	1400	0,38	1,7	2,6	1940	
<b>160</b>	240	60	2,1	610	0,22	3	4,6	1060	
	240	60	2,1	610	0,22	3	4,6	1060	
	240	60	2,1	610	0,22	3	4,6	1060	
	240	60	2,1	560	0,22	3	4,6	970	

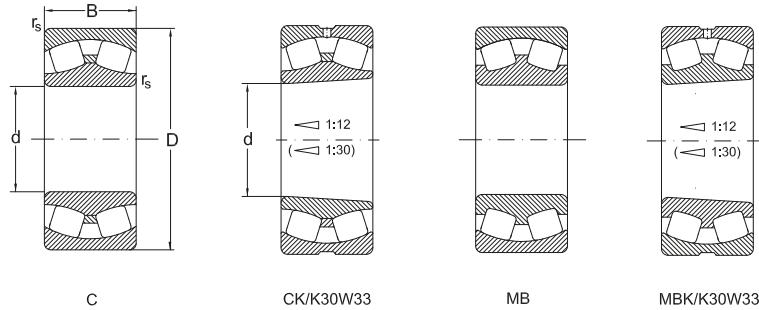
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>150</b>	2,1	1300	1700	<b>23130 MBKW33</b>	16,0
	2,5	1400	1800	<b>22230 C</b>	18,81
	2,5	1400	1800	<b>22230 CK</b>	18,43
	2,5	1400	1800	<b>22230 CKW33</b>	18,2
	2,5	1400	1800	<b>22230 CW33</b>	18,59
	2,3	1200	1600	<b>22230 MBK</b>	19,3
	2,3	1200	1600	<b>22230 MB</b>	17,79
	2,3	1200	1600	<b>22230 MBW33</b>	18,0
	2,3	1200	1600	<b>22230 MBKW33</b>	17,95
	1,7	1000	1300	<b>23230 MBK</b>	24,13
	1,7	1000	1300	<b>23230 MB</b>	24,58
	1,7	1000	1300	<b>23230 MBW33</b>	24,39
	1,7	1000	1300	<b>23230 MBKW33</b>	24,0
	1,8	1100	1400	<b>22330 C</b>	44,62
	1,8	1100	1400	<b>22330 CK</b>	43,87
	1,8	1100	1400	<b>22330 CKW33</b>	43,47
	1,8	1100	1400	<b>22330 CW33</b>	44,6
	1,7	1000	1300	<b>22330 MAKC4F80W33</b>	44,3
	1,7	1000	1300	<b>22330 MBK</b>	41,35
	1,7	1000	1300	<b>22330 MAC4F80W33</b>	44,4
	1,7	1000	1300	<b>22330 MB</b>	42,25
	1,7	1000	1300	<b>22330 MBW33</b>	41,85
	1,7	1000	1300	<b>22330 MBKW33</b>	40,95
<b>160</b>	2,8	1400	1900	<b>23032 C</b>	9,97
	2,8	1400	1900	<b>23032 CK</b>	9,71
	2,8	1400	1900	<b>23032 CKW33</b>	9,56
	2,8	1400	1900	<b>23032 CW33</b>	9,79
	2,8	1300	1700	<b>23032 MBK</b>	10,45

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	r_s min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>160</b>	240	60	2,1	560	0,22	3	4,6	970	
	240	60	2,1	560	0,22	3	4,6	970	
	240	60	2,1	560	0,22	3	4,6	970	
	240	60	2,1	720	0,32	2,1	3,1	1320	
	240	80	2,1	720	0,32	2,1	3,1	1320	
	240	80	2,1	720	0,32	2,1	3,1	1320	
	270	109	2,1	1250	0,39	1,7	2,5	2110	
	270	109	2,1	1250	0,39	1,7	2,5	2110	
	270	109	2,1	1250	0,39	1,7	2,5	1776	
	270	109	2,1	1250	0,39	1,7	2,5	2110	
	270	109	2,1	1250	0,39	1,7	2,5	2110	
	270	109	2,1	1250	0,39	1,7	2,5	2110	
	270	109	2,1	940	0,41	1,6	2,4	1558	
	270	86	2,1	1010	0,3	2,3	3,4	1640	
	270	86	2,1	930	0,32	2,1	3,2	1510	
	270	86	2,1	930	0,32	2,1	3,2	1510	
	270	86	2,1	930	0,32	2,1	3,2	1510	
	270	86	2,1	930	0,32	2,1	3,2	1510	
	290	104	3	1180	0,38	1,8	2,7	1830	
	290	104	3	1180	0,38	1,8	2,7	1830	
	290	104	3	1180	0,38	1,8	2,7	1830	
	290	104	3	1180	0,38	1,8	2,7	1830	
	290	80	3	1040	0,26	2,6	3,9	1550	
	290	80	3	1040	0,26	2,6	3,9	1550	
	290	80	3	1040	0,26	2,6	3,9	1550	
	290	80	3	1040	0,26	2,6	3,9	1550	
	290	80	3	950	0,29	2,3	3,4	1420	
	290	80	3	950	0,29	2,3	3,4	1420	

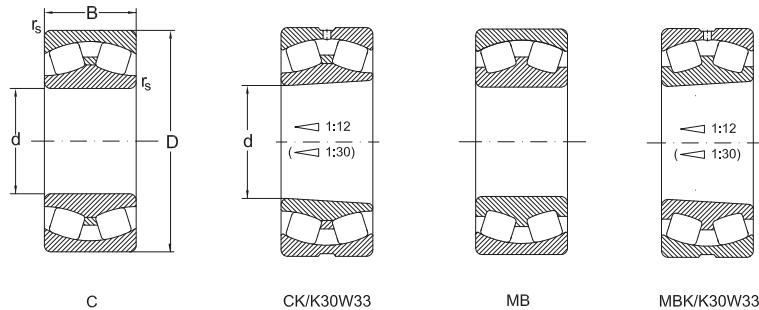
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>160</b>	2,8	1300	1700	<b>23032 MB</b>	10,61
	2,8	1300	1700	<b>23032 MBW33</b>	10,49
	2,8	1300	1700	<b>23032 MBKW33</b>	10,33
	2	1000	1300	<b>24032 MB</b>	14,79
	2	1000	1300	<b>24032 MBW33</b>	14,61
	2	1000	1300	<b>24032 MBK30W33</b>	14,42
	1,6	850	1100	<b>24132 C</b>	25,04
	1,6	850	1100	<b>24132 CW33</b>	24,96
	1,6	850	1100	<b>24132 CK30</b>	24,8
	1,6	850	1100	<b>24132 CK30W33</b>	24,76
	1,6	850	1100	<b>24132 CYK30W33</b>	24,85
	1,6	850	1100	<b>24132 CYW33</b>	25,05
	1,6	750	1100	<b>24132 MBW33</b>	25,38
	2,2	1400	1800	<b>23132 C</b>	22,9
	2,1	1200	1600	<b>23132 MBK</b>	20,9
	2,1	1200	1600	<b>23132 MB</b>	20,95
	2,1	1200	1600	<b>23132 MBW33</b>	20,81
	2,1	1200	1600	<b>23132 MBKW33</b>	20,1
<b>170</b>	1,7	900	1200	<b>23232 MBK</b>	31,56
	1,7	900	1200	<b>23232 MB</b>	31,7
	1,7	900	1200	<b>23232 MBW33</b>	31,7
	1,7	900	1200	<b>23232 MBKW33</b>	31,1
	2,5	1300	1700	<b>23232 C</b>	24,9
	2,5	1300	1700	<b>22232 CK</b>	23,31
	2,5	1300	1700	<b>22232 CKW33</b>	24,6
	2,5	1300	1700	<b>22232 CW33</b>	23,6
	2,3	1100	1500	<b>22232 MBK</b>	22,27
	2,3	1100	1500	<b>22232 MB</b>	23,3

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									kN
<b>160</b>	290	80	3	950	0,29	2,3	3,4	1420	
	290	80	3	950	0,29	2,3	3,4	1420	
	340	114	4	1660	0,35	1,9	2,9	2350	
	340	114	4	1660	0,35	1,9	2,9	2350	
	340	114	4	1660	0,35	1,9	2,9	2350	
	340	114	4	1660	0,35	1,9	2,9	2350	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	114	4	1520	0,37	1,8	2,7	2160	
	340	136	4	1540	0,44	1,5	2,3	2200	
<b>170</b>	260	67	2,1	750	0,23	2,9	4,4	1270	
	260	67	2,1	750	0,23	2,9	4,4	1270	
	260	67	2,1	750	0,23	2,9	4,4	1270	
	260	67	2,1	750	0,23	2,9	4,4	1270	
	260	67	2,1	680	0,23	2,9	4,4	1170	
	260	67	2,1	680	0,23	2,9	4,4	1170	
	260	67	2,1	680	0,23	2,9	4,4	1170	
	260	67	2,1	680	0,23	2,9	4,4	1170	
	260	90	2,1	880	0,34	2	3	1610	
	260	90	2,1	880	0,34	2	3	1610	
	260	90	2,1	880	0,34	2	3	1610	
	260	90	2,1	880	0,34	2	3	1610	
	280	109	2,1	1280	0,37	1,8	2,7	2230	

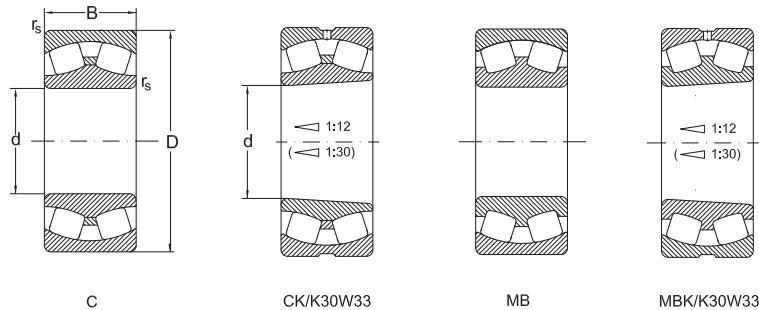
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>160</b>	2,3	1100	1500	<b>22232 MBW33</b>	22,53
	2,3	1100	1500	<b>22232 MBKW33</b>	22,03
	1,8	1000	1300	<b>22332 C</b>	52,6
	1,8	1000	1300	<b>22332 CK</b>	52,16
	1,8	1000	1300	<b>22332 CKW33</b>	51,74
	1,8	1000	1300	<b>22332 CW33</b>	52,7
	1,8	900	1200	<b>22332 MBK</b>	49,16
	1,8	900	1200	<b>22332 MAC4F80W33</b>	50,08
	1,8	900	1200	<b>22332 MAC4W502</b>	50,08
	1,8	900	1200	<b>22332 MAW33</b>	50,08
	1,8	900	1200	<b>22332 MAW502</b>	50,0
	1,8	900	1200	<b>22332 MB</b>	50,26
	1,8	900	1200	<b>22332 MBW33</b>	49,84
	1,8	900	1200	<b>22332 MBKW33</b>	48,74
	1,5	1000	1400	<b>23332 MAC4F80W33</b>	61,85
<b>170</b>	2,8	1400	1800	<b>23034 C</b>	14,23
	2,8	1400	1800	<b>23034 CK</b>	13,95
	2,8	1400	1800	<b>23034 CKW33</b>	13,78
	2,8	1400	1800	<b>23034 CW33</b>	14,2
	2,8	1200	1600	<b>23034 MBK</b>	14,3
	2,8	1200	1600	<b>23034 MB</b>	14,32
	2,8	1200	1600	<b>23034 MBW33</b>	14,18
	2,8	1200	1600	<b>23034 MBKW33</b>	14,08
	2	1000	1300	<b>24034 MBK30</b>	17,3
	2	1000	1300	<b>24034 MB</b>	17,57
	2	1000	1300	<b>24034 MBW33</b>	17,5
	2	1000	1300	<b>24034 MBK30W33</b>	17,2
	1,8	750	1000	<b>24134 C</b>	27,3

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					
		B	r <sub>s</sub> min.	dyn. C <sub>r</sub>	e	Y <sub>1</sub>	Y <sub>2</sub>	stat. C <sub>0r</sub>	
mm									kN
<b>170</b>	280	109	2,1	1280	0,39	1,7	2,6	2230	
	280	109	2,1	1280	0,39	1,7	2,6	2230	
	280	109	2,1	1280	0,39	1,7	2,6	2230	
	280	109	2,1	1280	0,39	1,7	2,6	2230	
	280	109	2,1	1029	0,37	1,8	2,7	1672	
	280	109	2,1	1029	0,37	1,8	2,7	1672	
	280	88	2,1	1280	0,37	1,8	2,7	2230	
	280	88	2,1	990	0,31	2,2	3,2	1650	
	280	88	2,1	990	0,31	2,2	3,2	1650	
	280	88	2,1	990	0,31	2,2	3,2	1650	
	280	88	2,1	990	0,31	2,2	3,2	1650	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1460	0,35	1,9	2,9	2320	
	310	110	4	1340	0,36	1,9	2,8	2120	
	310	110	4	1340	0,36	1,9	2,8	2120	
	310	86	4	1170	0,27	2,5	3,7	1750	
	310	86	4	1170	0,27	2,5	3,7	1750	
	310	86	4	1170	0,27	2,5	3,7	1750	
	310	86	4	1170	0,27	2,5	3,7	1750	
	310	86	4	1080	0,3	2,3	3,4	1610	
	310	86	4	1080	0,3	2,3	3,4	1610	
	310	86	4	1080	0,3	2,3	3,4	1610	

## Spherical Roller Bearings

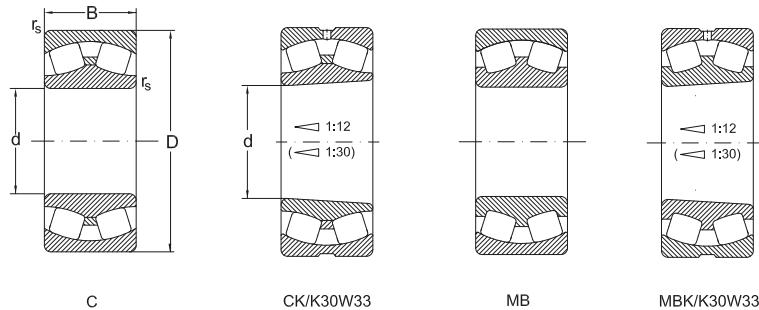
### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
170	1,7	750	1000	<b>24134 CA</b>	27,46
	1,7	750	1000	<b>24134 CAW33</b>	27,41
	1,7	750	1000	<b>24134 CAK30</b>	27,41
	1,7	750	1000	<b>24134 CAK30W33</b>	27,3
	1,8	650	800	<b>24134 MBK30W33</b>	27,94
	1,8	650	800	<b>24134 MBW33</b>	28,4
	1,8	1300	1700	<b>23134 C</b>	27,3
	2,1	1100	1500	<b>23134 MBK</b>	21,4
	2,1	1100	1500	<b>23134 MB</b>	21,46
	2,1	1100	1500	<b>23134 MBW33</b>	21,41
	2,1	1100	1500	<b>23134 MBKW33</b>	21,31
	1,8	900	1200	<b>23234 C</b>	35,82
	1,8	900	1200	<b>23234 CA</b>	37,47
	1,8	900	1200	<b>23234 CAK</b>	36,38
	1,8	900	1200	<b>23234 CAKW33</b>	36,41
	1,8	900	1200	<b>23234 CAW33</b>	37,17
	1,8	900	1200	<b>23234 CK</b>	34,75
	1,8	900	1200	<b>23234 CKW33</b>	34,55
	1,8	900	1200	<b>23234 CW33</b>	35,67
222	1,8	850	1100	<b>23234 MBW33</b>	37,8
	1,8	850	1100	<b>23234 MBKW33</b>	35,68
	2,5	1200	1600	<b>22234 C</b>	31,7
	2,5	1200	1600	<b>22234 CK</b>	31,7
	2,5	1200	1600	<b>22234 CKW33</b>	31,28
	2,5	1200	1600	<b>22234 CW33</b>	31,29
	2,2	1300	1100	<b>22234 MBK</b>	27,89
	2,2	1100	1400	<b>22234 MB</b>	28,5
	2,2	1100	1400	<b>22234 MBW33</b>	28,2

## Spherical Roller Bearings

### SR 3918



d	D	Dimensions		Basical radial load					stat. $C_{0r}$
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm		kN							
<b>170</b>	310	86	4	1080	0,3	2,3	3,4	1610	
	360	120	4	1850	0,33	2	3	2590	
	360	120	4	1850	0,33	2	3	2590	
	360	12	4	1850	0,33	2	3	2590	
	360	120	4	1850	0,33	2	3	2590	
	360	120	4	1690	0,37	1,8	2,7	2380	
	360	120	4	1690	0,37	1,8	2,7	2380	
	360	120	4	1690	0,37	1,8	2,7	2380	
	360	120	4	1690	0,37	1,8	2,7	2380	
	360	120	4	1690	0,37	1,8	2,7	2380	
<b>180</b>	250	52	2	454	0,2	3,5	5,2	830	
	280	100	2,1	1030	0,36	1,9	2,8	1900	
	280	100	2,1	1030	0,36	1,9	2,8	1900	
	280	100	2,1	1030	0,36	1,9	2,8	1900	
	280	74	2,1	870	0,24	2,8	4,2	1500	
	280	74	2,1	870	0,24	2,8	4,2	1500	
	280	74	2,1	870	0,24	2,8	4,2	1500	
	280	74	2,1	870	0,24	2,8	4,2	1500	
	280	74	2,1	800	0,24	2,8	4,2	1380	
	280	74	2,1	800	0,24	2,8	4,2	1380	
	280	74	2,1	800	0,24	2,8	4,2	1380	
	280	74	2,1	800	0,24	2,8	4,2	1380	
	300	118	3	1460	0,4	1,7	2,5	2590	
	300	118	3	1460	0,4	1,7	2,5	2590	
	300	118	3	1460	0,4	1,7	2,5	2590	
	300	118	3	1460	0,4	1,7	2,5	2590	
	300	118	3	1460	0,4	1,7	2,5	2590	

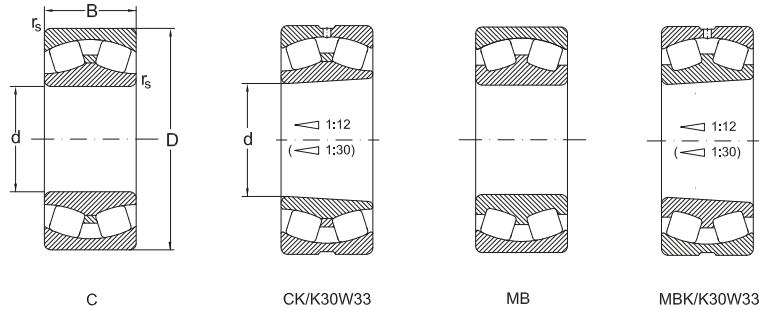
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>170</b>	2,2	1100	1400	<b>22234 MBKW33</b>	27,51
	2	900	1200	<b>22334 C</b>	65,3
	2	900	1200	<b>22334 CK</b>	63,99
	2	900	1200	<b>22334 CKW33</b>	63,59
	2	900	1200	<b>22334 CW33</b>	64,88
	1,8	850	1100	<b>22334 MBK</b>	57,53
	1,8	850	1100	<b>22334 MAC4F80W33</b>	60,01
	1,8	850	1100	<b>22334 MB</b>	58,83
	1,8	850	1100	<b>22334 MBW33</b>	58,41
	1,8	850	1100	<b>22334 MBKW33</b>	60,2
<b>180</b>	3,4	1300	1700	<b>23936 MBW33</b>	7,79
	1,9	900	1200	<b>24036 MB</b>	22,9
	1,9	900	1200	<b>24036 MBW33</b>	22,79
	1,9	900	1200	<b>24036 MBK30W33</b>	22,42
	2,8	1300	1700	<b>23036 C</b>	18,76
	2,8	1300	1700	<b>23036 CK</b>	18,36
	2,8	1300	1700	<b>23036 CKW33</b>	18,13
	2,8	1300	1700	<b>23036 CW33</b>	18,53
	2,8	1100	1500	<b>23036 MBK</b>	17,5
	2,8	1100	1500	<b>23036 MB</b>	17,26
	2,8	1100	1500	<b>23036 MBW33</b>	17,03
	2,8	1100	1500	<b>23036 MBKW33</b>	17,0
	1,6	700	950	<b>24136 C</b>	33,52
	1,6	700	950	<b>24136 CAK30W33</b>	33,0
	1,6	700	950	<b>24136 CAW33</b>	33,0
	1,6	700	950	<b>24136 CW33</b>	33,42
	1,6	700	950	<b>24136 CK30</b>	33,32
	1,6	700	950	<b>24136 CK30W33</b>	33,2

## Spherical Roller Bearings SR 3918



d	D	Dimensions		Basical radial load					
		B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$	stat. $C_{0r}$	
mm									kN
<b>180</b>	300	118	3	1460	0,4	1,7	2,5	2590	
	300	96	3	1260	0,3	2,3	3,4	2110	
	300	96	3	1260	0,3	2,3	3,4	2110	
	300	96	3	1260	0,3	2,3	3,4	2110	
	300	96	3	1160	0,32	2,1	3,1	1940	
	300	96	3	1160	0,32	2,1	3,1	1940	
	300	96	3	1160	0,32	2,1	3,1	1940	
	300	96	3	1160	0,32	2,1	3,1	1940	
	300	118	3	1193	0,4	1,7	2,5	1962	
	320	86	4	791	0,25	2,7	4	1395	
	320	112	4	1420	0,36	1,9	2,8	2330	
	320	112	4	1420	0,36	1,9	2,8	2330	
	320	112	4	1420	0,36	1,9	2,8	2330	
	320	86	4	1210	0,26	2,6	3,9	1870	
	320	86	4	1210	0,26	2,6	3,9	1870	
	320	86	4	1210	0,26	2,6	3,9	1870	
	320	86	4	1210	0,26	2,6	3,9	1870	
	320	86	4	1110	0,29	2,3	3,5	1720	
	320	86	4	1110	0,29	2,3	3,5	1720	
	320	86	4	1110	0,29	2,3	3,5	1720	
	320	86	4	1110	0,29	2,3	3,5	1720	
	380	126	4	1900	0,37	1,8	2,7	2700	
	380	126	4	1900	0,37	1,8	2,7	2700	
	380	126	4	1900	0,37	1,8	2,7	2700	
	380	126	4	1900	0,37	1,8	2,7	2700	
	380	126	4	1900	0,37	1,8	2,7	2700	

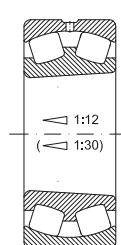
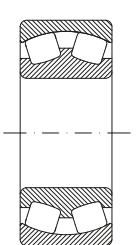
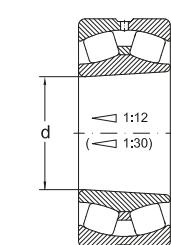
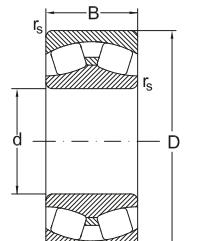
## Spherical Roller Bearings

### SR 3918

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
mm		[min <sup>-1</sup> ]	[min <sup>-1</sup> ]		
<b>180</b>	1,6	700	950	<b>24136 CYW33</b>	33,0
	2,2	1200	1600	<b>23136 C</b>	30,6
	2,2	1200	1600	<b>23136 CKW33</b>	29,38
	2,2	1200	1600	<b>23136 CW33</b>	30,25
	2,1	1100	1400	<b>23136 MBK</b>	28,34
	2,1	1100	1400	<b>23136 MB</b>	28,4
	2,1	1100	1400	<b>23136 MBW33</b>	28,09
	2,1	1100	1400	<b>23136 MBKW33</b>	28,0
	1,6	600	750	<b>24136 MBK30W33</b>	33,32
	2,7	1200	1600	<b>22236 CKC3W33</b>	32,11
	1,8	750	1000	<b>23236 MBK</b>	38,5
	1,8	750	1000	<b>23236 MBW33</b>	39,81
	1,8	750	1000	<b>23236 MBKW33</b>	40,1
	2,5	1100	1500	<b>22236 C</b>	33,13
	2,5	1100	1500	<b>22236 CK</b>	32,58
	2,5	1100	1500	<b>22236 CKW33</b>	32,11
	2,5	1100	1500	<b>22236 CW33</b>	32,66
	2,3	1100	1400	<b>22236 MBK</b>	28,99
	2,3	1100	1400	<b>22236 MB</b>	29,69
	2,3	1100	1400	<b>22236 MBW33</b>	29,54
	2,3	1100	1400	<b>22236 MBKW33</b>	28,84
	1,8	850	1100	<b>22336 MBK</b>	67,18
	1,8	850	1100	<b>22336 MAC4F80W33</b>	71,8
	1,8	850	1100	<b>22336 MB</b>	68,68
	1,8	850	1100	<b>22336 MBW33</b>	71,8
	1,8	850	1100	<b>22336 MBKW33</b>	71,8

## Spherical Roller Bearings



C

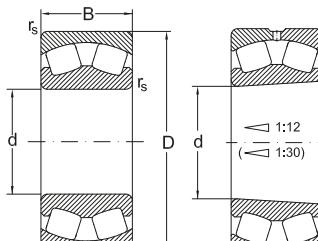
CK/K30W33

MB

MBK/K30W33

d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				mm	mm	dyn. $C_r$	e	$\gamma_1$	
<b>190</b>									
260	52	2	2	465	0.18	3.7	5.5	900	
260	52	2	2	465	0.18	3.7	5.5	900	
290	75	2.1	2.1	915	0.23	3	4.4	1530	
290	75	2.1	2.1	915	0.23	3	4.4	1530	
290	100	2.1	2.1	1080	0.34	2	3	1980	
290	100	2.1	2.1	1080	0.34	2	3	1980	
320	104	3	3	1320	0.33	2	3	2290	
320	104	3	3	1320	0.33	2	3	2290	
320	128	3	3	1330	0.37	1.8	2.7	2320	
320	128	3	3	1330	0.37	1.8	2.7	2320	
320	128	3	3	1540	0.37	1.8	2.7	2750	
320	128	3	3	1540	0.37	1.8	2.7	2750	
340	92	4	4	1200	0.26	2.6	3.9	1830	
340	92	4	4	1200	0.26	2.6	3.9	1830	
340	120	4	4	1750	0.35	1.9	2.9	2880	
340	120	4	4	1750	0.35	1.9	2.9	2880	
400	132	5	5	1860	0.37	1.8	2.7	2500	
400	132	5	5	1860	0.37	1.8	2.7	2500	
<b>200</b>									
280	60	2.1	2.1	525	0.2	3.4	5.1	1020	
280	60	2.1	2.1	525	0.2	3.4	5.1	1020	
310	82	2.1	2.1	1060	0.23	2.9	4.3	1760	
310	82	2.1	2.1	1060	0.23	2.9	4.3	1760	
310	109	2.1	2.1	1140	0.35	1.9	2.9	2280	

## Spherical Roller Bearings



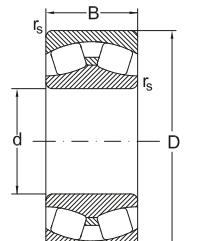
CA

CAK/K30W33

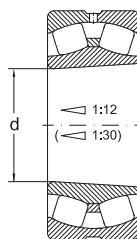
*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease min <sup>-1</sup>	oil min <sup>-1</sup>		
<b>190</b>	3.6	1100	1500	<b>23938 M</b>	8.46
	3.6	1100	1500	<b>23938 MBK</b>	8.46
	2.9	1300	1700	<b>23038 C</b>	16.08
	2.9	1300	1700	<b>23038 CK</b>	16.08
	2	850	1100	<b>24038 MB</b>	24.5
	2	850	1100	<b>24038 MBK30</b>	24.5
	2	1100	1400	<b>23138 MB</b>	35.6
	2	1100	1400	<b>23138 MBK</b>	35.6
	1.8	670	900	<b>24138 CAW33</b>	41.4
	1.8	670	900	<b>24138 CAK30W33</b>	41.4
	1.8	670	900	<b>24138 MBW33</b>	41.4
	1.8	670	900	<b>24138 MBK30W33</b>	41.4
	2.5	1100	1400	<b>22238 C</b>	37.2
	2.5	1100	1400	<b>22238 CK</b>	37.2
	1.8	850	1100	<b>23238 C</b>	52.4
	1.8	850	1100	<b>23238 CK</b>	52.4
<b>200</b>	1.8	750	1000	<b>22238 M</b>	81.2
	1.8	750	1000	<b>22238 MBK</b>	81.2
	3.3	1100	1400	<b>23940 MB</b>	11.5
	3.3	1100	1400	<b>23940 MBK</b>	11.5
	2.8	1300	1700	<b>23040 C</b>	21.5
	2.8	1300	1700	<b>23040 CK</b>	21.5
	1.9	850	1100	<b>24040 MB</b>	30.5

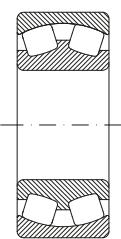
## Spherical Roller Bearings



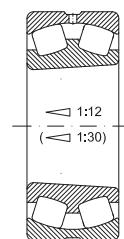
C



CK/K30W33



MB



MBK/K30W33

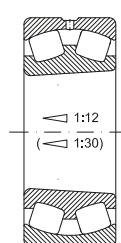
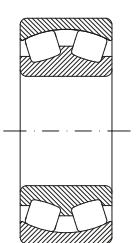
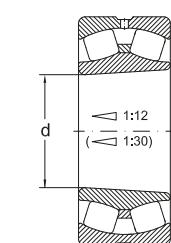
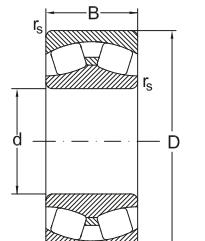
d	D	B	$r_s$ min.	Dimensions		Basical radial load				stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$	$\text{min}^{-1}$	$\text{min}^{-1}$	
mm										kN
<b>200</b>	310	109	2.1	1140	0.35	1.9	2.9	2280		
	340	112	3	1370	0.35	1.9	2.9	2460		
	340	112	3	1370	0.35	1.9	2.9	2460		
	340	140	3	1700	0.35	2	2.9	3000		
	340	140	3	1700	0.35	2	2.9	3000		
	360	98	4	1250	0.29	2.3	3.9	2020		
	360	98	4	1250	0.29	2.3	3.9	2020		
	360	128	4	1620	0.35	1.9	2.9	2590		
	360	128	4	1620	0.35	1.9	2.9	2590		
	420	138	5	1910	0.36	1.8	2.8	2750		
	420	138	5	1910	0.36	1.8	2.8	2750		
<b>220</b>	300	60	2.1	625	0.18	3.8	5.6	1344		
	300	60	2.1	625	0.18	3.8	5.6	1344		
	340	90	3	1100	0.26	2.6	3.8	2000		
	340	90	3	1100	0.26	2.6	3.8	2000		
	340	118	3	1400	0.34	2	2.9	2700		
	340	118	3	1400	0.34	2	2.9	2700		
	340	140	4	1900	0.41	1.6	2.4	3450		
	340	140	4	1900	0.41	1.6	2.4	3450		
	370	120	4	1515	0.3	2.3	3.4	2509		
	370	120	4	1515	0.3	2.3	3.4	2509		
	400	108	4	1545	0.29	2.3	3.4	2300		
	400	108	4	1545	0.29	2.3	3.4	2300		
	400	144	4	2065	0.35	1.9	2.9	3380		

## Spherical Roller Bearings

*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>200</b>	1.9	850	1100	<b>24040 MBK</b>	30.5
	1.9	1100	1400	<b>23140 MB</b>	43.5
	1.9	1100	1400	<b>23140 MBK</b>	43.5
	1.9	800	1000	<b>24140 C</b>	52.5
	1.9	800	1000	<b>24140 CK30</b>	52.5
	2.3	1100	1400	<b>22240 C</b>	44.4
	2.3	1100	1400	<b>22240 CK</b>	44.4
	1.8	750	1000	<b>23240 C</b>	58.4
	1.8	750	1000	<b>23240 CK</b>	58.4
	1.8	670	900	<b>22340 M</b>	91.8
	1.8	670	900	<b>22340 MBK</b>	91.8
<b>220</b>	3.7	1100	1500	<b>23944 MB</b>	13
	3.7	1100	1500	<b>23944 MBK</b>	13
	2.5	900	1200	<b>23044 MB</b>	31
	2.5	900	1200	<b>23044 MBK</b>	31
	1.9	750	1000	<b>24044 MB</b>	39.5
	1.9	750	1000	<b>24044 MBK30</b>	39.5
	1.6	700	900	<b>24144 MB</b>	65.5
	1.6	700	900	<b>24144 MBK30</b>	65.5
	2.2	1000	1300	<b>23144 MBK</b>	52
	2.2	1000	1300	<b>23144 MB</b>	52
	2.3	900	1200	<b>22244 C</b>	61.4
	2.3	900	1200	<b>22244 CK</b>	61.4
	1.8	670	900	<b>23244 C</b>	79.5

## Spherical Roller Bearings



C

CK/K30W33

MB

MBK/K30W33

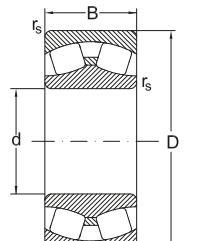
d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>220</b>	400	144	4	2065	0.35	1.9	2.9	3380	
	460	145	5	2380	0.36	1.8	2.8	3407	
	460	145	5	2380	0.36	1.8	2.8	3407	
<b>240</b>	320	60	2.1	600	0.17	4.1	6	1170	
	320	60	2.1	600	0.17	4.1	6	1170	
	360	92	3	1160	0.25	2.7	4.1	2200	
	360	92	3	1160	0.25	2.7	4.1	2200	
	360	118	3	1460	0.32	2.1	3.1	2841	
	360	118	3	1460	0.32	2.1	3.1	2841	
	400	160	4	1780	0.41	1.7	2.5	3109	
	400	160	4	1780	0.41	1.7	2.5	3109	
	400	128	4	1705	0.3	2.3	3.4	2863	
	400	128	4	1705	0.3	2.3	3.4	2863	
	440	120	4	1845	0.29	2.3	3.4	2763	
	440	120	4	1845	0.29	2.3	3.4	2763	
	440	160	4	2530	0.35	1.9	2.9	4600	
	440	160	4	2530	0.35	1.9	2.9	4600	
	500	155	5	2650	0.31	2.2	3.3	4000	
	500	155	5	2650	0.31	2.2	3.3	4000	
<b>260</b>	360	75	2.1	845	0.19	3.5	5.3	1604	
	360	75	2.1	845	0.19	3.5	5.3	1604	
	400	104	4	1500	0.26	2.6	3.9	2800	
	400	104	4	1500	0.26	2.6	3.9	2800	

## Spherical Roller Bearings

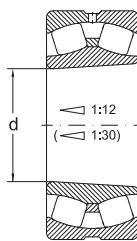
*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>220</b>	1.8	670	900	<b>23244 CK</b>	79.5
	1.8	700	950	<b>22344 C</b>	120
	1.8	700	950	<b>22344 CK</b>	120
<b>240</b>	4	1000	1300	<b>23948 MBK</b>	14
	4	1000	1300	<b>23948 MB</b>	14
	2.7	800	1000	<b>23048 MBK</b>	33.9
	2.7	800	1000	<b>23048 MB</b>	33.9
	2.1	750	1000	<b>24048 MBK30</b>	42.5
	2.1	750	1000	<b>24048 MB</b>	42.5
	1.6	530	700	<b>24148 MB</b>	79.5
	1.6	530	700	<b>24148 MBK30</b>	79.5
	2.2	900	1200	<b>23148 MBK</b>	66
	2.2	900	1200	<b>23148 MB</b>	66
	2.3	850	1100	<b>22248 C</b>	83.2
	2.3	850	1100	<b>22248 CK</b>	83.2
	1.8	630	850	<b>23248 C</b>	109
	1.8	630	850	<b>23248 CK</b>	109
	2.2	560	750	<b>22348 M</b>	151
	2.2	560	750	<b>22348 MBK</b>	151
	3.5	850	1100	<b>23952 MBK</b>	24
<b>260</b>	3.5	850	1100	<b>23952 MB</b>	24
	2.6	750	950	<b>23052 MBK</b>	49
	2.6	750	950	<b>23052 MB</b>	49

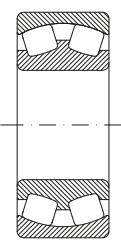
## Spherical Roller Bearings



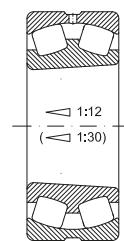
C



CK/K30W33



MB



MBK/K30W33

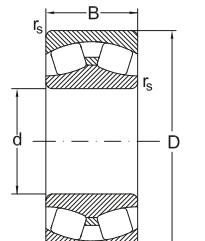
d	D	B	$r_s$ min.	Dimensions		Basical radial load				stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$	$\text{min}^{-1}$	$\text{min}^{-1}$	
mm										kN
<b>260</b>	400	140	4	1775	0.35	1.9	2.9	$\text{min}^{-1}$		3494
	400	140	4	1775	0.35	1.9	2.9	$\text{min}^{-1}$		3494
	440	180	4	2500	0.42	1.6	2.4	$\text{min}^{-1}$		5100
	440	180	4	2500	0.42	1.6	2.4	$\text{min}^{-1}$		5100
	440	144	4	2153	0.31	2.2	3.3	$\text{min}^{-1}$		3673
	440	144	4	2153	0.31	2.2	3.3	$\text{min}^{-1}$		3673
	480	130	5	2190	0.29	2.3	3.4	$\text{min}^{-1}$		3300
	480	130	5	2190	0.29	2.3	3.4	$\text{min}^{-1}$		3300
	540	165	6	3125	0.36	1.8	2.8	$\text{min}^{-1}$		4560
	540	165	6	3125	0.36	1.8	2.8	$\text{min}^{-1}$		4560
<b>280</b>	380	75	2.1	950	0.18	3.8	5.6	$\text{min}^{-1}$		2000
	380	75	2.1	950	0.18	3.8	5.6	$\text{min}^{-1}$		2000
	420	106	4	1560	0.25	2.7	4.1	$\text{min}^{-1}$		3000
	420	106	4	1560	0.25	2.7	4.1	$\text{min}^{-1}$		3000
	420	140	4	2000	0.33	2	3	$\text{min}^{-1}$		4000
	420	140	4	2000	0.33	2	3	$\text{min}^{-1}$		4000
	460	146	5	2295	0.3	2.3	3.4	$\text{min}^{-1}$		4050
	460	146	5	2295	0.3	2.3	3.4	$\text{min}^{-1}$		4050
	460	180	5	2635	0.39	1.7	2.5	$\text{min}^{-1}$		4848
	460	180	5	2635	0.39	1.7	2.5	$\text{min}^{-1}$		4848
	500	130	5	2330	0.29	2.3	3.4	$\text{min}^{-1}$		3600
	500	130	5	2330	0.29	2.3	3.4	$\text{min}^{-1}$		3600
	500	176	5	2806	0.35	1.9	2.9	$\text{min}^{-1}$		4645
	500	176	5	2806	0.35	1.9	2.9	$\text{min}^{-1}$		4645

## Spherical Roller Bearings

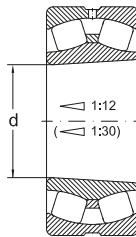
*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>260</b>	1.9	600	800	<b>24052 MBK30</b>	66
	1.9	600	800	<b>24052 MB</b>	66
	1.6	480	630	<b>24152 MB</b>	110
	1.6	480	630	<b>24152 MBK30</b>	110
	2.2	850	1100	<b>23152 MBK</b>	92.5
	2.2	850	1100	<b>23152 MB</b>	92.5
	2.3	750	1000	<b>22252 MB</b>	107
	2.3	750	1000	<b>22252 MBK</b>	107
	1.8	600	800	<b>22352 C</b>	187
	1.8	600	800	<b>22352 CK</b>	187
<b>280</b>	3.7	900	1200	<b>23956 MBK</b>	26
	3.7	900	1200	<b>23956 MB</b>	26
	2.7	700	900	<b>23056 MBK</b>	52.5
	2.7	700	900	<b>23056 MB</b>	52.5
	2	560	750	<b>24056 MBK30</b>	68.5
	2	560	750	<b>24056 MB</b>	68.5
	2.2	750	1000	<b>23156 MBK</b>	98.5
	2.2	750	1000	<b>23156 MB</b>	98.5
	1.7	400	530	<b>24156 MB</b>	118
	1.7	400	530	<b>24156 MBK30</b>	118
	2.3	700	950	<b>22256 MB</b>	113
	2.3	700	950	<b>22256 MBK</b>	113
	1.8	480	630	<b>23256 MB</b>	153
	1.8	480	630	<b>23256 MBK</b>	153

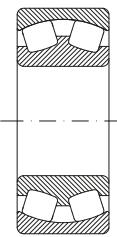
## Spherical Roller Bearings



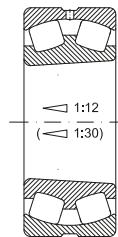
C



CK/K30W33



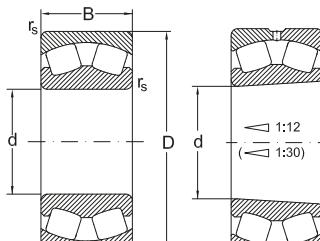
MB



MBK/K30W33

d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>280</b>	580	175	6	3530	0.36	1.8	2.8	5208	
	580	175	6	3530	0.36	1.8	2.8	5208	
<b>300</b>	420	90	3	1175	0.2	3.4	5.1	2261	
	420	90	3	1175	0.2	3.4	5.1	2261	
	460	118	4	1960	0.25	2.7	4	3650	
	460	118	4	1960	0.25	2.7	4	3650	
	460	160	4	2385	0.35	2	2.9	4702	
	460	160	4	2385	0.35	2	2.9	4702	
	500	160	5	2385	0.3	2.3	3.4	4485	
	500	160	5	2385	0.3	2.3	3.4	4485	
	500	200	5	3213	0.4	1.7	2.5	6011	
	500	200	5	3213	0.4	1.7	2.5	6011	
	540	140	5	2655	0.29	2.3	3.4	4230	
	540	140	5	2655	0.29	2.3	3.4	4230	
<b>320</b>	440	90	3	1215	0.19	3.6	5.4	2409	
	440	90	3	1215	0.19	3.6	5.4	2409	
	480	121	4	2040	0.25	2.7	4.1	4000	
	480	121	4	2040	0.25	2.7	4.1	4000	
	480	160	4	2500	0.33	2.1	3.1	5240	
	480	160	4	2500	0.33	2.1	3.1	5240	
	540	176	5	3115	0.34	2	3	6000	
	540	176	5	3115	0.34	2	3	6000	
	540	218	5	3750	0.41	1.7	2.5	7300	

## Spherical Roller Bearings

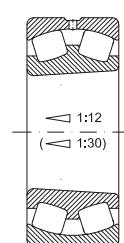
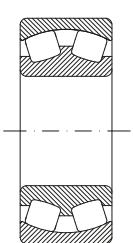
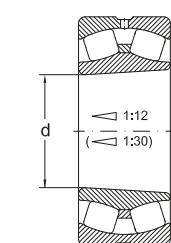
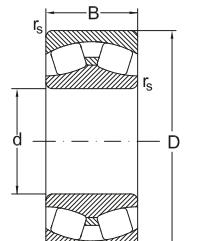


*Abutment and fillet dimensions see on page 377*

CA CAK/K30W33

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>280</b>	1.8	560	750	<b>22356 C</b>	235
	1.8	560	750	<b>22356 CK</b>	235
<b>300</b>	3.3	750	1000	<b>23960 MBK</b>	40
	3.3	750	1000	<b>23960 MB</b>	40
	2.6	630	800	<b>23060 MBK</b>	73.6
	2.6	630	800	<b>23060 MB</b>	73.6
	1.9	560	759	<b>24060 MBK30</b>	97
	1.9	560	759	<b>24060 MB</b>	97
	2.2	700	950	<b>23160 MBK</b>	129
	2.2	700	950	<b>23160 MB</b>	129
	1.6	430	560	<b>24160 MB</b>	159
	1.6	430	560	<b>24160 MBK30</b>	159
	2.3	670	900	<b>22260 CAKW33</b>	142
	2.3	670	900	<b>22260 CAW33</b>	142
<b>320</b>	3.5	670	900	<b>23964 MBK</b>	42
	3.5	670	900	<b>23964 MB</b>	42
	2.7	600	750	<b>23064 MBK</b>	79.5
	2.7	600	750	<b>23064 MB</b>	79.5
	2	530	700	<b>24064 MBK30</b>	106
	2	530	700	<b>24064 MB</b>	106
	1.9	530	670	<b>23164 MB</b>	165
	1.9	530	670	<b>23164 MBK</b>	165
	1.6	400	530	<b>24164 MB</b>	215

## Spherical Roller Bearings



C

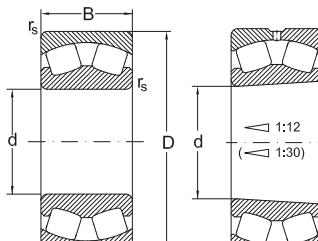
CK/K30W33

MB

MBK/K30W33

d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>320</b>	540	218	5	3750	0.41	1.7	2.5	7300	
	580	150	5	2997	0.29	2.5	3.7	4740	
	580	150	5	2997	0.29	2.5	3.7	4740	
	580	208	5	4130	0.35	1.9	2.9	7026	
	580	208	5	4130	0.35	1.9	2.9	7026	
<b>340</b>	440	90	3	1306	0.189	3.8	5.7	2691	
	440	90	3	1306	0.189	3.8	5.7	2691	
	520	133	5	2360	0.25	2.7	4	4500	
	520	133	5	2360	0.25	2.7	4	4500	
	520	180	5	2912	0.34	2	2.9	5961	
	520	180	5	2912	0.34	2	2.9	5961	
	580	190	5	3605	0.31	2.2	3.2	6409	
	580	190	5	3605	0.31	2.2	3.2	6409	
	580	243	5	4400	0.43	1.6	2.3	8500	
	580	243	5	4400	0.43	1.6	2.3	8500	
<b>360</b>	480	90	3	1030	0.17	4.1	6	3200	
	480	90	3	1030	0.17	4.1	6	3200	
	540	134	5	2450	0.25	2.7	4.1	4800	
	540	134	5	2450	0.25	2.7	4.1	4800	
	540	180	5	3150	0.33	2.1	3.1	6530	
	540	180	5	3150	0.33	2.1	3.1	6530	
	600	192	5	3740	0.33	2.3	3.4	7010	
	600	192	5	3740	0.33	2.3	3.4	7010	

## Spherical Roller Bearings

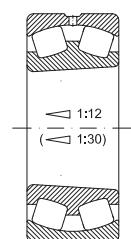
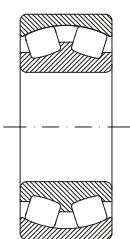
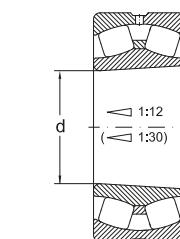
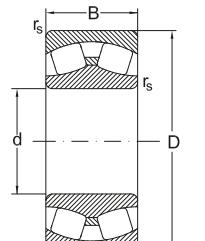


*Abutment and fillet dimensions see on page 377*

CA                    CAK/K30W33

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease min <sup>-1</sup>	oil min <sup>-1</sup>		
<b>320</b>	1.6	400	530	<b>24164 MBK30</b>	215
	2.5	630	580	<b>22264 CAKW33</b>	180
	2.5	630	580	<b>22264 CAW33</b>	180
	1.8	430	560	<b>23264 MB</b>	247
	1.8	430	560	<b>23264 MBK</b>	247
<b>340</b>	3.8	630	850	<b>23968 MBK</b>	45
	3.8	630	850	<b>23698 MB</b>	45
	2.6	560	700	<b>23068 MBK</b>	105
	2.6	560	700	<b>23068 MB</b>	105
	1.9	480	600	<b>24068 CAW33</b>	143
	1.9	480	600	<b>24068 CAK30W33</b>	143
	2.2	630	850	<b>23168 MBK</b>	212
	2.2	630	850	<b>23168 MB</b>	212
	1.5	450	560	<b>24168 MB</b>	266
	1.5	450	560	<b>24168 MBK30</b>	266
<b>360</b>	4	560	700	<b>23972 MBK</b>	47
	4	560	700	<b>23972 MB</b>	47
	2.7	530	670	<b>23072 MBK</b>	111
	2.7	530	670	<b>23072 MB</b>	111
	2	480	630	<b>24072 MBK30</b>	145
	2	480	630	<b>24072 MB</b>	145
	2.2	600	800	<b>23172 MBK</b>	220
	2.2	600	800	<b>23172 MB</b>	220

## Spherical Roller Bearings



C

CK/K30W33

MB

MBK/K30W33

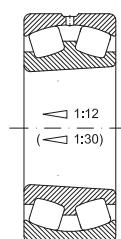
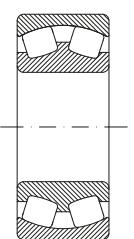
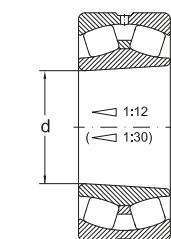
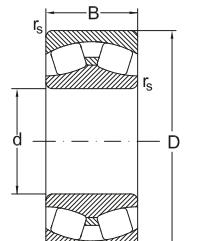
d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>360</b>	600	243	5	4500	0.41	1.6	2.4	9000	
	600	243	5	4500	0.41	1.6	2.4	9000	
	650	232	6	4880	0.35	1.9	2.9	8490	
	650	232	6	4880	0.35	1.9	2.9	8490	
<b>380</b>	520	106	4	1785	0.19	3.6	5.3	4000	
	520	106	4	1785	0.19	3.6	5.3	4000	
	560	135	5	2550	0.25	2.8	4.2	5300	
	560	135	5	2550	0.25	2.8	4.2	5300	
	560	180	5	3150	0.31	2.2	3.2	6710	
	560	180	5	3150	0.31	2.2	3.2	6710	
	620	194	5	3740	0.3	2.3	3.4	7540	
	620	194	5	3740	0.3	2.3	3.4	7540	
	620	243	5	4650	0.39	1.7	2.5	9500	
	620	243	5	4650	0.39	1.7	2.5	9500	
	680	240	6	5050	0.35	1.9	2.9	9660	
	680	240	6	5050	0.35	1.9	2.9	9660	
<b>400</b>	540	106	4	1850	0.18	3.7	5.5	3990	
	540	106	4	1850	0.18	3.7	5.5	3990	
	600	148	5	3050	0.24	2.8	4.1	6200	
	600	148	5	3050	0.24	2.8	4.1	6200	
	600	200	5	3610	0.33	2.1	3.1	7545	
	600	200	5	3610	0.33	2.1	3.1	7545	
	650	200	6	4100	0.28	2.4	3.6	7730	

## Spherical Roller Bearings

*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>360</b>	1.6	430	530	<b>24172 MB</b>	278
	1.6	430	530	<b>24172 MBK30</b>	278
	1.8	430	560	<b>23272 MB</b>	344
	1.8	430	560	<b>23272 MBK</b>	344
<b>380</b>	3.5	630	850	<b>23976 MBK</b>	70
	3.5	630	850	<b>23976 MB</b>	70
	2.8	500	630	<b>23076 MBK</b>	117
	2.8	500	630	<b>23076 MB</b>	117
	2.1	450	600	<b>24076 MBK30</b>	152
	2.1	450	600	<b>24076 MB</b>	152
	2.2	560	750	<b>23176 MBK</b>	240
	2.2	560	750	<b>23176 MB</b>	240
	1.7	400	500	<b>24176 MB</b>	290
	1.7	400	500	<b>24176 MBK30</b>	290
	1.8	400	530	<b>23276 MB</b>	375
	1.8	400	530	<b>23276 MBK</b>	375
<b>400</b>	3.6	600	800	<b>23980 MB</b>	72
	3.6	600	800	<b>23980 MBK</b>	72
	2.7	450	560	<b>23080 MBK</b>	152
	2.7	450	560	<b>23080 MB</b>	152
	2	430	460	<b>24080 MB</b>	205
	2	430	460	<b>24080 MBK30</b>	205
	2.5	530	700	<b>23180 MBK</b>	265

## Spherical Roller Bearings



C

CK/K30W33

MB

MBK/K30W33

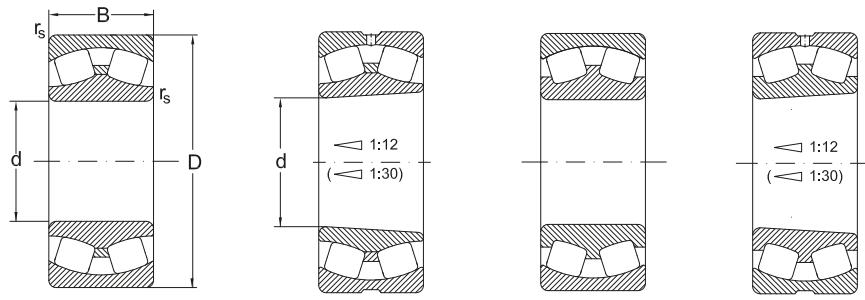
d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
				mm		kN		$\text{min}^{-1}$	$\text{min}^{-1}$
<b>400</b>	650	200	6	4100	0.28	2.4	3.6	7730	
	650	250	6	5100	0.39	1.7	2.6	10400	
	650	250	6	5100	0.39	1.7	2.6	10400	
	720	256	6	5950	0.35	1.9	2.9	10807	
	720	256	6	5950	0.35	1.9	2.9	10807	
<b>420</b>	560	106	4	1960	0.18	3.8	5.7	4130	
	560	106	4	1960	0.18	3.8	5.7	4130	
	620	150	5	3150	0.24	2.8	4.2	6550	
	620	150	5	3150	0.24	2.8	4.2	6550	
	620	200	5	4000	0.32	2.1	3.2	8800	
	620	200	5	4000	0.32	2.1	3.2	8800	
	700	224	6	4600	0.33	2	3	9000	
	700	224	6	4600	0.33	2	3	9000	
	700	224	6	6200	0.33	2	3	12700	
	700	224	6	6200	0.33	2	3	12700	
	760	272	7.5	6575	0.35	1.9	2.9	11717	
<b>440</b>	600	118	4	2100	0.18	3.7	5.5	4690	
	600	118	4	2100	0.18	3.7	5.5	4690	
	650	157	6	3400	0.24	2.8	4.2	7100	
	650	157	6	3400	0.24	2.8	4.2	7100	
	650	212	6	4300	0.32	2.1	3.2	9650	
	650	212	6	4300	0.32	2.1	3.2	9650	

## Spherical Roller Bearings

*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease min <sup>-1</sup>	oil min <sup>-1</sup>		
<b>400</b>	2.5	530	700	<b>23180 MB</b>	265
	1.7	380	480	<b>24180 MB</b>	326
	1.7	380	480	<b>24180 MBK30</b>	326
	1.8	380	500	<b>23280 MB</b>	450
	1.8	380	500	<b>23280 MBK</b>	450
<b>420</b>	3.8	600	800	<b>23984 MBK</b>	75
	3.8	600	800	<b>23984 MB</b>	75
	2.8	450	560	<b>23084 MBK</b>	160
	2.8	450	560	<b>23084 MB</b>	160
	2.1	380	480	<b>24084 MBK30</b>	214
	2.1	380	480	<b>24084 MB</b>	214
	2	500	670	<b>23184 C</b>	363
	2	500	670	<b>23184 CK</b>	363
	2	400	500	<b>24184 MB</b>	443
	2	400	500	<b>24184 MBK30</b>	443
	1.8	360	480	<b>23284 MB</b>	540
	1.8	360	480	<b>23284 MBK</b>	540
<b>440</b>	3.6	560	750	<b>23988 MBK</b>	102
	3.6	560	750	<b>23988 MB</b>	102
	2.8	430	530	<b>23088 MBK</b>	184
	2.8	430	530	<b>23088 MB</b>	184
	2.1	360	450	<b>24088 MBK30</b>	249
	2.1	360	450	<b>24088 MB</b>	249

## Spherical Roller Bearings



C

CK/K30W33

MB

MBK/K30W33

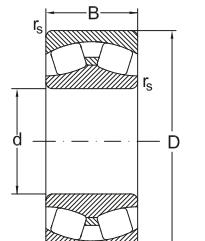
d	D	B	$r_s$ min.	Basical radial load					stat. $C_{0r}$	
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$			
mm								kN	$\text{min}^{-1}$	$\text{min}^{-1}$
<b>440</b>	720	226	6	5250	0.3	2.3	3.4	10000		
	720	226	6	5250	0.3	2.3	3.4	10000		
	720	280	6	6400	0.38	1.8	2.6	13200		
	720	280	6	6400	0.38	1.8	2.6	13200		
	790	280	7.5	7100	0.35	1.9	2.9	13400		
	790	280	7.5	7100	0.35	1.9	2.9	13400		
<b>460</b>	620	118	4	2305	0.18	3.8	5.7	5036		
	620	118	4	2305	0.18	3.8	5.7	5036		
	680	163	6	3650	0.24	2.8	4.2	7650		
	680	163	6	3650	0.24	2.8	4.2	7650		
	680	218	6	4370	0.31	2.2	3.2	9570		
	680	218	6	4370	0.31	2.2	3.2	9570		
	760	240	7.5	5760	0.3	2.3	3.4	11025		
	760	240	7.5	5760	0.3	2.3	3.4	11025		
	760	300	7.5	7500	0.39	1.7	2.6	15600		
	760	300	7.5	7500	0.39	1.7	2.6	15600		
	830	296	7.5	7560	0.35	1.9	2.9	13970		
	830	296	7.5	7560	0.35	1.9	2.9	13970		
<b>480</b>	650	128	5	2525	0.18	3.8	5.6	5500		
	650	128	5	2525	0.18	3.8	5.6	5500		
	700	165	6	3800	0.23	2.9	4.3	8150		
	700	165	6	3800	0.23	2.9	4.3	8150		
	700	218	6	4900	0.3	2.3	3.3	11200		

## Spherical Roller Bearings

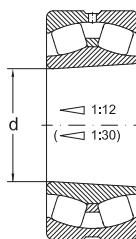
*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>440</b>	2.2	500	670	<b>23188 C</b>	360
	2.2	500	670	<b>23188 CK</b>	360
	1.7	340	430	<b>24188 MB</b>	454
	1.7	340	430	<b>24188 MBK30</b>	454
	1.8	360	480	<b>23288 MB</b>	595
	1.8	360	480	<b>23288 MBK</b>	595
<b>460</b>	3.8	530	700	<b>23992 MBK</b>	105
	3.8	530	700	<b>23992 MB</b>	105
	2.8	400	500	<b>23092 MBK</b>	210
	2.8	400	500	<b>23092 MB</b>	210
	2.1	380	500	<b>24092 MBK30</b>	280
	2.1	380	500	<b>24092 MB</b>	280
	2.2	480	630	<b>23192 C</b>	441
	2.2	480	630	<b>23192 CK</b>	441
	1.7	320	400	<b>24192 MB</b>	578
	1.7	320	400	<b>24192 MBK30</b>	578
	1.9	340	450	<b>23292 MB</b>	695
	1.9	340	450	<b>23292 MBK</b>	695
<b>480</b>	3.7	450	600	<b>23996 MB</b>	128
	3.7	450	600	<b>23996 MBK</b>	128
	2.8	380	480	<b>23096 MBK</b>	220
	2.8	380	480	<b>23096 MB</b>	220
	2.2	340	430	<b>24096 MBK30</b>	288

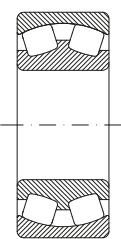
## Spherical Roller Bearings



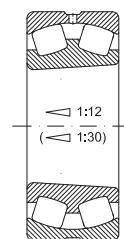
C



CK/K30W33



MB



MBK/K30W33

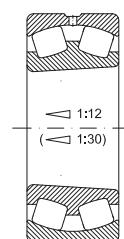
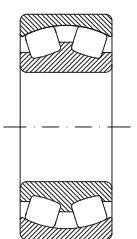
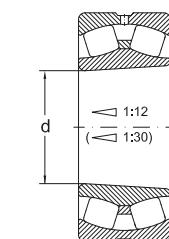
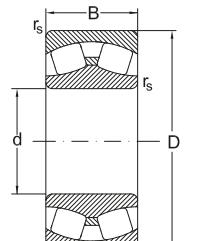
d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>480</b>	700	218	6	4900	0.3	2.3	3.3	11200	
	790	248	7.5	5800	0.3	2.3	3.4	11800	
	790	248	7.5	5800	0.3	2.3	3.4	11800	
	790	308	7.5	8000	0.39	1.8	2.6	16600	
	790	308	7.5	8000	0.39	1.8	2.6	16600	
	870	310	7.5	8800	0.37	1.8	2.7	17000	
	870	310	7.5	8800	0.37	1.8	2.7	17000	
<b>500</b>	670	128	5	2500	0.17	3.9	5.8	6090	
	670	128	5	2500	0.17	3.9	5.8	6090	
	720	167	6	3900	0.22	3	4.5	8500	
	720	167	6	3900	0.22	3	4.5	8500	
	720	218	6	4900	0.29	2.3	3.5	11200	
	720	218	6	4900	0.29	2.3	3.5	11200	
	830	264	7.5	6550	0.3	2.3	3.4	13200	
	830	264	7.5	6550	0.3	2.3	3.4	13200	
	830	325	7.5	8650	0.39	1.7	2.6	18300	
	830	325	7.5	8650	0.39	1.7	2.6	18300	
	920	336	7.5	9650	0.38	1.8	2.7	18300	
	920	336	7.5	9650	0.38	1.8	2.7	18300	
<b>530</b>	710	136	5	2980	0.18	3.8	5.7	6755	
	710	136	5	2980	0.18	3.8	5.7	6755	
	780	185	6	4400	0.22	3	4.5	9500	
	780	185	6	4400	0.22	3	4.5	9500	

## Spherical Roller Bearings

*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease $\text{min}^{-1}$	oil $\text{min}^{-1}$		
<b>480</b>	2.2	340	430	<b>24096 MB</b>	288
	2.2	450	600	<b>23196 C</b>	485
	2.2	450	600	<b>23196 CK</b>	485
	1.7	320	400	<b>24196 MB</b>	639
	1.7	320	400	<b>24196 MBK30</b>	639
	1.8	340	430	<b>23296 MB</b>	835
	1.8	340	430	<b>23296 MBK</b>	835
<b>500</b>	3.8	480	630	<b>239/500 MBK</b>	130
	3.8	480	630	<b>239/500 MB</b>	130
	2.9	380	480	<b>230/500 MBK</b>	229
	2.9	380	480	<b>230/500 MB</b>	229
	2.3	320	400	<b>240/500 MBK30</b>	297
	2.3	320	400	<b>240/500 MB</b>	297
	2.2	430	560	<b>231/500 MBK</b>	580
	2.2	430	560	<b>231/500 MB</b>	580
	1.7	300	380	<b>241/500 MB</b>	753
	1.7	300	380	<b>241/500 MBK30</b>	753
	1.7	320	400	<b>232/500 MB</b>	1010
	1.7	320	400	<b>232/500 MBK</b>	1010
<b>530</b>	3.8	450	600	<b>239/530 MB</b>	150
	3.8	450	600	<b>239/530 MBK</b>	150
	3	340	430	<b>230/530 MB</b>	310
	3	340	430	<b>230/530 MBK</b>	310

## Spherical Roller Bearings



C

CK/K30W33

MB

MBK/K30W33

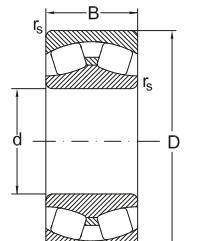
d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>530</b>	780	250	6	5640	0.31	2.2	3.2	12800	
	780	250	6	5640	0.31	2.2	3.2	12800	
	870	335	7.5	9500	0.38	1.8	2.6	20000	
	870	335	7.5	9500	0.38	1.8	2.6	20000	
	870	272	7.5	7625	0.3	2.3	3.4	15000	
	870	272	7.5	7625	0.3	2.3	3.4	15000	
<b>560</b>	750	140	5	3100	0.17	4	5.9	7650	
	750	140	5	3100	0.17	4	5.9	7650	
	820	195	6	5100	0.23	2.9	4.4	11000	
	820	195	6	5100	0.23	2.9	4.4	11000	
	820	258	6	6400	0.31	2.2	3.3	14600	
	820	258	6	6400	0.31	2.2	3.3	14600	
	920	280	7.5	8294	0.3	2.3	3.4	16295	
	920	280	7.5	8294	0.3	2.3	3.4	16295	
	920	355	7.5	10600	0.38	1.8	2.6	22400	
	920	355	7.5	10600	0.38	1.8	2.6	22400	
<b>600</b>	800	150	5	3450	0.17	4	5.9	8650	
	800	150	5	3450	0.17	4	5.9	8650	
	870	200	6	5700	0.22	3.1	4.6	12500	
	870	200	6	5700	0.22	3.1	4.6	12500	
	870	272	6	7100	0.31	2.2	3.3	16600	
	870	272	6	7100	0.31	2.2	3.3	16600	
	980	300	7.5	9000	0.31	1.8	2.7	19300	

## Spherical Roller Bearings

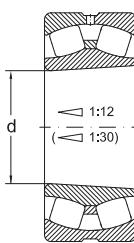
*Abutment and fillet dimensions see on page 377*

d mm	$\gamma_0$	Speed limit		Designation	Mass [kg]
		grease min <sup>-1</sup>	oil min <sup>-1</sup>		
<b>530</b>	2.1	340	450	<b>240/530 MB</b>	410
	2.1	340	450	<b>240/530 MBK30</b>	410
	1.7	280	360	<b>241/530 MB</b>	838
	1.7	280	360	<b>241/530 MBK30</b>	838
	2.2	400	530	<b>231/530 MBK</b>	645
	2.2	400	530	<b>231/530 MB</b>	645
<b>560</b>	3.9	340	430	<b>239/560 MBK</b>	183
	3.9	340	430	<b>239/560 MB</b>	183
	2.9	320	400	<b>230/560 MBK</b>	358
	2.9	320	400	<b>230/560 MB</b>	358
	2.2	280	360	<b>240/560 MBK30</b>	469
	2.2	280	360	<b>240/560 MB</b>	469
	2.2	380	500	<b>231/560 MBK</b>	740
	2.2	380	500	<b>231/560 MB</b>	740
	1.7	260	340	<b>241/560 MB</b>	979
	1.7	260	340	<b>241/560 MBK30</b>	979
<b>600</b>	3.9	320	400	<b>239/600 MBK</b>	221
	3.9	320	400	<b>239/600 MB</b>	221
	3	300	380	<b>230/600 MBK</b>	406
	3	300	380	<b>230/600 MB</b>	406
	2.2	260	340	<b>240/600 MBK30</b>	550
	2.2	260	340	<b>240/600 MB</b>	550
	2.2	280	360	<b>231/600 MB</b>	933

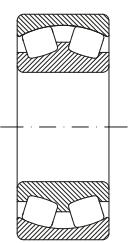
## Spherical Roller Bearings



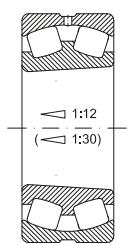
C



CK/K30W33



MB



MBK/K30W33

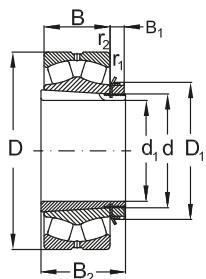
d	D	B	$r_s$ min.	Dimensions		Basical radial load			stat. $C_{0r}$
				dyn. $C_r$	e	$\gamma_1$	$\gamma_2$		
mm									
<b>600</b>	980	300	7.5	9000	0.31	1.8	2.7	19300	
	980	375	7.5	11600	0.38	1.8	2.7	26000	
	980	375	7.5	11600	0.38	1.8	2.7	26000	
<b>630</b>	850	165	6	4290	0.18	3.8	5.7	9910	
	850	165	6	4290	0.18	3.8	5.7	9910	
	920	212	7.5	6300	0.31	2.2	3.3	14000	
	920	212	7.5	6300	0.31	2.2	3.3	14000	
	920	290	7.5	8000	0.31	2.2	3.3	19000	
	920	290	7.5	8000	0.31	2.2	3.3	19000	
<b>670</b>	900	170	6	4300	0.17	4	5.9	10600	
	900	170	6	4300	0.17	4	5.9	10600	
	980	230	7.5	7200	0.22	3	4.5	16000	
	980	230	7.5	7200	0.22	3	4.5	16000	
	980	308	7.5	9000	0.31	2.2	3.3	21600	
	980	308	7.5	9000	0.31	2.2	3.3	21600	
<b>710</b>	950	180	6	4800	0.18	3.8	5.7	12000	
	950	180	6	4800	0.18	3.8	5.7	12000	
<b>750</b>	1000	185	6	5200	0.17	4	5.9	12900	
	1000	185	6	5200	0.17	4	5.9	12900	

## Spherical Roller Bearings

*Abutment and fillet  
dimensions see on  
page 377*

d	$\gamma_0$	Speed limit		Designation	Mass
		grease	oil		
	mm		$\text{min}^{-1}$		[kg]
<b>600</b>	2.2	280	360	<b>231/600 MBK</b>	933
	1.8	240	320	<b>241/600 MB</b>	1180
	1.8	240	320	<b>241/600 MBK30</b>	1180
<b>630</b>	3.7	380	500	<b>239/630 MBK</b>	280
	3.7	380	500	<b>239/630 MB</b>	280
	2.2	260	340	<b>230/630 MBK</b>	661
	2.2	260	340	<b>230/630 MB</b>	661
	2.2	260	340	<b>240/630 MBK30</b>	661
	2.2	260	340	<b>240/630 MB</b>	661
<b>670</b>	3.9	280	360	<b>239/670 MBK</b>	326
	3.9	280	360	<b>239/670 MB</b>	326
	2.9	260	340	<b>230/670 MBK</b>	602
	2.9	260	340	<b>230/670 MB</b>	602
	2.2	240	320	<b>240/670 MBK30</b>	802
	2.2	240	320	<b>240/670 MB</b>	802
<b>710</b>	3.8	260	340	<b>239/710 MBK</b>	386
	3.8	260	340	<b>239/710 MB</b>	386
<b>750</b>	3.9	260	340	<b>239/750 MBK</b>	437
	3.9	260	340	<b>239/750 MB</b>	437

## Spherical Roller Bearings with Adapter Sleeve



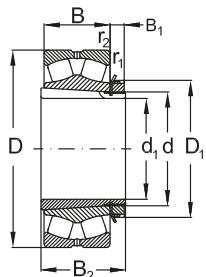
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
		Bearing	Adapter Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
<b>20</b>	25 52 18 1	<b>22205 CK</b>	<b>H305</b>	43	46	7500	10000
<b>25</b>	30 62 20 1	<b>22206 CK</b>	<b>H306</b>	59	62	6300	8500
<b>30</b>	35 72 23 1,1	<b>22207 CK</b>	<b>H307</b>	81	88	5300	7000
	35 80 21 1,5	<b>22307 CK</b>	<b>H307</b>	71	73,5	5300	6700
<b>35</b>	40 80 23 1,1	<b>22208 CK</b>	<b>H308</b>	88	98	4800	6300
	40 90 23 1,5	<b>21308 CK</b>	<b>H308</b>	99	120	4500	6000
	40 90 33 1,5	<b>22308 CK</b>	<b>H2308</b>	140	145	4300	5600
<b>40</b>	45 85 23 1,1	<b>22209 CK</b>	<b>H309</b>	93	105	4500	6000
	45 100 25 1,5	<b>21309 CK</b>	<b>H309</b>	120	135	4000	5300
	45 100 36 1,5	<b>22309 CK</b>	<b>H2309</b>	165	190	3800	5000
<b>45</b>	50 90 23 1,1	<b>22210 CK</b>	<b>H310</b>	100	120	4000	5300
	50 110 27 2	<b>21310 CK</b>	<b>H310</b>	120	130	3600	4800
	50 110 40 2	<b>22310 CK</b>	<b>H2310</b>	190	220	3400	4500
<b>50</b>	55 100 25 1,5	<b>22211 CK</b>	<b>H311</b>	120	140	3800	5000
	55 120 29 2	<b>21311 CK</b>	<b>H311</b>	135	155	3200	4300
	55 120 43 2	<b>22311 CK</b>	<b>H2311</b>	230	265	3000	4000
<b>55</b>	60 110 28 1,5	<b>22212 CK</b>	<b>H312</b>	145	175	3400	4500
	60 130 31 2,1	<b>21312 CK</b>	<b>H312</b>	150	180	3000	4000

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions				Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	D <sub>1</sub>	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Adapter Sleeve
<b>mm</b>									[kg]
<b>20</b>	9	29	38	0,35	1,9	2,9	1,8	0,18	0,071
<b>25</b>	9	31	45	0,36	1,9	2,8	1,9	0,38	0,095
<b>30</b>	10	35	52	0,36	1,9	2,8	1,9	0,41	0,14
	10	35	52	0,26	2,6	3,8	2,5	0,50	0,14
<b>35</b>	11	36	58	0,31	2,2	3,2	2,1	0,49	0,17
	11	36	58	0,26	2,6	3,9	2,6	0,70	0,17
	11	46	58	0,40	1,6	2,5	2	1,10	0,22
<b>40</b>	12	39	65	0,30	2,3	3,4	2,2	0,54	0,23
	12	39	65	0,26	2,6	3,9	2,6	0,95	0,23
	12	50	65	0,40	1,7	2,5	1,6	1,36	0,27
<b>45</b>	13	42	70	0,26	2,6	3,4	2,5	0,61	0,27
	13	42	70	0,24	2,8	4,1	2,7	1,25	0,27
	13	55	70	0,40	1,7	2,5	1,6	1,82	0,34
<b>50</b>	14	45	75	0,27	2,5	3,9	2,5	0,80	0,32
	14	45	75	0,24	2,8	4,1	2,7	1,65	0,32
	14	59	75	0,40	1,7	2,5	1,6	2,31	0,39
<b>55</b>	14	47	80	0,27	2,5	3,8	2,4	1,06	0,36
	14	47	80	0,24	2,9	4,3	2,8	1,95	0,36

## Spherical Roller Bearings with Adapter Sleeve



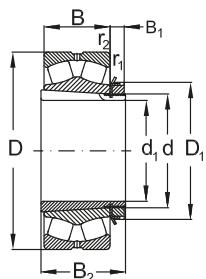
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
		Bearing	Adapter Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
55	60 130 46 2,1	22312 CK	H2312	270	320	2800	3800
60	65 120 31 1,5	22213 CK	H313	180	220	3000	4000
	65 140 33 2,1	21313 CK	H313	196	228	2800	3800
	65 140 48 2,1	22313 CK	H2313	305	360	2800	3600
	70 125 31 1,5	22214 CK	H314	180	225	2800	3800
	70 150 35 2,1	21314 CK	H314	250	310	2600	3400
	70 150 51 2,1	22314 CK	H2314	325	375	2400	3200
65	75 130 31 1,5	22215 CK	H315	190	250	2800	3800
	75 160 37 2,1	21315 CK	H315	280	360	2400	3200
	75 160 55 2,1	22315 CK	H2315	375	440	2200	3000
70	80 140 33 2	22216 CK	H316	210	275	2600	3400
	80 170 39 2,1	21316 CK	H316	275	340	2200	3000
	80 170 58 2,1	22316 CK	H2316	410	500	1800	2400
75	85 150 36 2	22217 CK	H317	250	325	2400	3200
	85 180 41 3	21317 CK	H317	350	450	2200	2800
	85 180 60 3	22317 CK	H2317	500	620	1800	2400
80	90 160 40 2	22218 CK	H318	305	410	2200	3000
	90 160 52 2	23218 CK	H2318	340	485	1500	2000
	90 190 43 3	21318 CK	H318	335	415	2200	2800

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft $\Phi d_1$	Dimensions				Calculation factor			Mass	
	$B_1$	$B_2$	$D_1$	$e$	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Adapter Sleeve
mm									[kg]
<b>55</b>	14	62	80	0,4	1,7	2,5	1,7	2,93	0,45
<b>60</b>	15	50	85	0,28	2,4	3,7	2,4	1,4	0,42
	15	50	85	0,24	2,8	4,2	2,8	2,45	0,42
	15	65	85	0,39	1,7	2,6	1,7	3,54	0,52
	15	52	92	0,26	2,6	3,6	2,6	1,52	0,67
	15	52	92	0,23	2,9	4,4	2,9	3,10	0,67
	15	68	92	0,38	1,8	2,6	1,7	4,19	0,88
<b>65</b>	16	55	98	0,24	2,8	3,9	2,7	1,61	0,78
	16	55	98	0,23	2,9	4,4	2,9	3,55	0,78
	16	73	98	0,38	1,9	2,6	1,7	5,21	1,10
<b>70</b>	18	59	105	0,25	2,6	4,1	2,6	1,97	0,95
	18	59	105	0,23	2,9	4,4	2,9	4,25	0,95
	18	78	105	0,35	1,9	0,9	1,8	6,20	1,20
<b>75</b>	19	63	110	0,216	2,6	4	0,6	2,47	1,10
	19	63	110	0,22	3	4,5	2,9	5,10	1,10
	19	82	110	0,33	2	3	2	7,10	1,35
<b>80</b>	19	65	120	0,27	2,5	3,9	2,5	3,18	1,30
	19	86	120	0,34	2	3	2	4,6	1,60
	19	65	120	0,22	3	4,5	2,9	5,8	1,30

## Spherical Roller Bearings with Adapter Sleeve



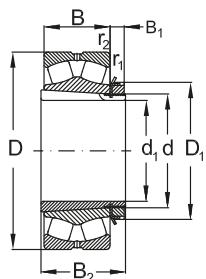
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
		Bearing	Adapter Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
80	90 190 64 3	22318 CK	H2318	510	620	1800	2400
85	95 170 43 2,1	22219 CK	H319	340	450	2200	2800
	95 200 45 3	21319 CK	H319	360	450	2000	2600
	95 200 67 3	22319 CK	H2319	580	700	1700	2200
90	100 165 52 2	23120 MBK	H3120	355	540	2000	3000
	100 180 46 2,1	22220 CK	H320	375	500	2200	2800
	100 180 60,3 2,1	23220 CK	H2320	495	720	1700	2200
	100 215 73 3	22320 CK	H2320	730	960	1500	2000
100	110 170 45 2	23022 CK	H322	335	510	2200	3000
	110 180 56 2	23122 MBK	H3122	410	640	1800	2400
	110 200 53 2,1	22222 CK	H322	455	585	2000	2800
	110 200 69,8 2,1	23222 CK	H2322	620	850	1400	1800
	110 240 80 3	22322 MBK	H2322	800	1060	1400	1900
110	120 180 46 2	23024 CK	H3024	360	570	2200	3000
	120 200 62 2	23124 MBK	H3124	495	770	1700	2200
	120 215 58 2,1	22224 CK	H3124	560	800	1700	2200
	120 215 76 2,1	23224 CK	H2324	730	1120	1300	1700
	120 260 86 3	22324 MBK	H2324	900	1400	1300	1700
115	130 200 52 2	23026 CK	H3026	455	720	1900	2600

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft $\Phi d_1$	Dimensions				Calculation factor			Mass	
	$B_1$	$B_2$	$D_1$	$e$	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Adapter Sleeve
mm									[kg]
<b>80</b>	19	86	120	0,36	1,9	2,8	1,8	8,44	1,60
<b>85</b>	20	68	125	0,24	2,8	3,8	2,8	3,86	1,40
	20	68	125	0,22	3	4,5	3	7,43	1,40
	20	90	125	0,35	1,9	2,9	1,8	9,77	1,80
<b>90</b>	21	76	130	0,31	2,2	3,2	2,1	4,50	1,80
	21	71	130	0,24	2,8	4,2	2,8	4,69	1,60
	21	97	130	0,33	2	3	2	7,34	2,00
	21	97	130	0,33	2	3	2	12,60	2,00
<b>100</b>	21	77	145	0,23	2,9	4,3	2,8	3,54	2,05
	21	81	145	0,30	2,3	3,3	2,2	5,50	2,10
	21	77	145	0,25	2,7	4,2	2,5	6,70	2,05
	21	105	145	0,33	2	3	2	10,80	2,75
	21	105	145	0,37	1,8	2,7	1,8	17,50	2,75
<b>110</b>	22	72	145	0,22	3	4,5	3	3,86	1,80
	22	88	155	0,31	2,2	3,3	2,2	7,60	2,50
	22	88	155	0,29	2,3	4	2,3	8,44	2,50
	22	112	155	0,35	1,9	2,9	1,8	13,10	3,00
	22	112	155	0,36	1,8	2,7	1,8	21,90	3,00
<b>115</b>	23	80	155	0,23	2,9	4,4	2,9	5,61	2,80

## Spherical Roller Bearings with Adapter Sleeve



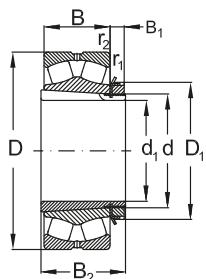
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
		Bearing	Adapter Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
<b>115</b>	130 210 64 2	<b>23126 MBK</b>	<b>H3126</b>	540	860	1500	2000
	130 230 64 3	<b>22226 CK</b>	<b>H3126</b>	660	960	1700	2200
	130 230 80 3	<b>23226 CK</b>	<b>H2326</b>	830	1270	1300	1700
	130 280 93 4	<b>22326 MBK</b>	<b>H2326</b>	1040	1340	1200	1600
<b>125</b>	140 210 53 2	<b>23028 CK</b>	<b>H3028</b>	480	780	1900	2600
	140 225 68 2,1	<b>23128 MBK</b>	<b>H3128</b>	600	990	1400	1800
	140 250 68 3	<b>22228 CK</b>	<b>H3128</b>	730	1080	1400	1900
	140 250 88 3	<b>23228 CK</b>	<b>H2328</b>	915	1370	1250	1400
	140 300 102 4	<b>22328 MBK</b>	<b>H2328</b>	1220	1600	1100	1400
<b>135</b>	150 225 56 2,1	<b>23030 CK</b>	<b>H3030</b>	530	865	1800	2400
	150 250 80 2,1	<b>23130 MBK</b>	<b>H3130</b>	800	1320	1300	1700
	150 270 73 3	<b>22230 CK</b>	<b>H3130</b>	880	1300	1400	1800
	150 270 96 3	<b>23230 CK</b>	<b>H2330</b>	1030	1610	1000	1300
	150 320 108 4	<b>22330 MBK</b>	<b>H2330</b>	1370	1830	1100	1500
<b>140</b>	160 240 60 2,1	<b>23032 CK</b>	<b>H3032</b>	600	1000	1600	2000
	160 270 86 2,1	<b>23132 MBK</b>	<b>H3132</b>	930	1510	1200	1600
	160 290 80 3	<b>22232 CK</b>	<b>H3132</b>	965	1370	1300	1700
	160 290 104 3	<b>23232 CK</b>	<b>H2332</b>	1180	1830	1200	1600
	160 340 114 4	<b>22332 MBK</b>	<b>H2332</b>	1430	1900	1000	1300

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft	Dimensions				Calculation factor			Mass		
	$\Phi d_1$	$B_1$	$B_2$	$D_1$	e	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Adapter Sleeve
mm									[kg]	
<b>115</b>	23	92	165	0,3	2,3	3,3	2,2	8,50	3,45	
	23	92	165	0,29	2,3	3,5	2,3	10,50	3,45	
	23	121	165	0,33	2	3	2	15,80	4,45	
	23	121	165	0,37	1,8	2,7	1,8	27,10	4,45	
<b>125</b>	24	82	165	0,22	3,1	4,6	3	6,04	3,05	
	24	97	180	0,30	2,3	3,3	2,2	10,50	4,10	
	24	97	180	0,26	2,6	3,5	2,5	13,40	4,10	
	24	131	180	0,33	2	3	2	20,80	5,40	
	24	131	180	0,38	1,7	2,6	1,7	34,10	5,40	
<b>135</b>	26	87	180	0,22	3,1	4,6	3	7,33	3,75	
	26	111	195	0,32	2,1	3,2	2,1	16,30	5,25	
	26	111	195	0,26	2,6	3,9	2,5	16,90	5,25	
	26	139	195	0,38	1,8	2,7	1,7	24,50	6,40	
	26	139	195	0,38	1,7	2,6	1,7	40,90	6,40	
<b>140</b>	28	93	190	0,22	3,1	4,6	3	8,90	5,10	
	28	119	210	0,32	2,1	3,2	2,1	20,50	7,25	
	28	119	210	0,26	2,6	3,9	2,5	21,70	7,25	
	28	147	210	0,38	1,8	2,7	1,7	31,70	8,80	
	28	147	210	0,37	1,8	2,7	1,8	51,10	8,80	

## Spherical Roller Bearings with Adapter Sleeve



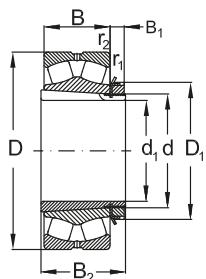
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
		Bearing	Adapter Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
<b>150</b>	170 260 67 2,1	<b>23034 CK</b>	<b>H3034</b>	735	1200	1500	1900
	170 280 88 2,1	<b>23134 MBK</b>	<b>H3134</b>	990	1650	1100	1500
	170 310 86 4	<b>22234 CK</b>	<b>H3134</b>	1170	1750	1200	1600
	170 310 110 4	<b>23234 CK</b>	<b>H2334</b>	1370	2120	900	1200
	170 360 120 4	<b>22334 MBK</b>	<b>H2334</b>	1600	2120	900	1200
<b>160</b>	180 280 74 2,1	<b>23036 CK</b>	<b>H3036</b>	865	1430	1400	1800
	180 300 96 3	<b>23136 CK</b>	<b>H3136</b>	1160	1940	1100	1400
	180 320 86 4	<b>22236 CK</b>	<b>H3136</b>	1210	1870	1100	1500
	180 320 112 4	<b>23236 CK</b>	<b>H2336</b>	1420	2330	1000	1400
	180 380 126 4	<b>22336 MBK</b>	<b>H2336</b>	1760	2360	850	1100
<b>170</b>	190 290 75 2,1	<b>23038 CK</b>	<b>H3038</b>	915	1530	1300	1700
	190 320 104 3	<b>23138 MBK</b>	<b>H3138</b>	1320	2290	1100	1400
	190 340 92 4	<b>22238 CK</b>	<b>H3138</b>	1200	1830	1100	1400
	190 340 120 4	<b>23238 CK</b>	<b>H2338</b>	1750	2880	850	1100
	190 400 132 5	<b>22338 MBK</b>	<b>H2338</b>	1860	2500	750	1000
<b>180</b>	200 310 82 2,1	<b>23040 CK</b>	<b>H3040</b>	1060	1760	1300	1700
	200 340 112 3	<b>23140 MBK</b>	<b>H3140</b>	1370	2460	1100	1400
	200 360 98 4	<b>22240 CK</b>	<b>H3140</b>	1250	2020	1100	1400
	200 360 128 4	<b>23240 CK</b>	<b>H2340</b>	1620	2590	750	1000
	200 420 138 5	<b>22340 MBK</b>	<b>H2340</b>	1910	2750	670	900

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft	Dimensions				Calculation factor			Mass		
	$\Phi d_1$	$B_1$	$B_2$	$D_1$	e	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Adapter Sleeve
mm										[kg]
<b>150</b>	29	101	200	0,23	3	4,4	2,9	12,10	5,80	
	29	122	220	0,31	2,2	3,2	2,1	22	8,10	
	29	122	220	0,27	2,5	3,9	2,5	26,20	8,10	
	29	154	220	0,35	1,9	2,9	1,8	35,70	9,90	
	29	154	220	0,37	1,8	2,7	1,8	59,70	9,90	
<b>160</b>	30	109	210	0,23	2,9	4,3	2,8	15,80	6,70	
	30	131	230	0,32	2,1	3,1	2,1	28,40	9,15	
	30	131	230	0,26	2,6	3,7	2,5	27,50	9,15	
	30	161	230	0,36	1,9	2,8	1,8	40,80	11,0	
	30	161	230	0,37	1,8	2,7	1,8	69,40	11,0	
<b>170</b>	31	112	220	0,23	3	4,4	2,9	16,08	7,25	
	31	141	240	0,33	2	3	2	35,60	10,5	
	31	141	240	0,26	2,6	3,9	2,5	37,20	10,5	
	31	169	240	0,35	1,9	2,9	1,8	52,40	12,0	
	31	169	240	0,37	1,8	2,7	1,8	81,20	12,0	
<b>180</b>	32	120	240	0,23	2,9	4,3	2,8	21,50	8,90	
	32	150	250	0,35	1,9	2,9	1,9	43,50	12,0	
	32	150	250	0,29	2,3	3,9	2,3	44,40	12,0	
	32	176	250	0,35	1,9	2,9	1,8	58,40	13,5	
	32	176	250	0,36	1,8	2,8	1,8	91,80	13,5	

## Spherical Roller Bearings with Adapter Sleeve



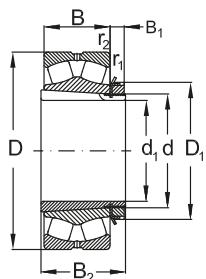
Shaft $\Phi d_1$	Dimensions					Bearing	Designation Adapter Sleeve	Basical radial load		Speed limit	
	d	D	B	$r_1, r_2$ min.				dyn. $C_r$	stat. $C_{0r}$	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							kN				
<b>200</b>	220	340	90	3		<b>23044 MBK</b>	<b>OH3044 H</b>	1100	2000	900	1200
	220	370	120	4		<b>23144 MBK</b>	<b>OH3144 H</b>	1515	2509	1000	1300
	220	400	108	4		<b>22244 CK</b>	<b>OH3144 H</b>	1545	2300	900	1200
	220	400	144	4		<b>23244 CK</b>	<b>OH2344 H</b>	2065	3380	670	900
	220	460	145	5		<b>22344 CK</b>	<b>OH2344 H</b>	2380	3407	700	950
<b>220</b>	240	360	92	3		<b>23048 MBK</b>	<b>OH3048 H</b>	1160	2200	800	1000
	240	400	128	4		<b>23148 MBK</b>	<b>OH3148 H</b>	1705	2863	900	1200
	240	440	120	4		<b>22248 CK</b>	<b>OH3148 H</b>	1845	2763	850	1100
	240	440	160	4		<b>23248 CK</b>	<b>OH2348 H</b>	2530	4600	630	850
	240	500	155	5		<b>22348 MBK</b>	<b>OH2348 H</b>	2650	4000	560	750
<b>240</b>	260	400	104	4		<b>23052 MBK</b>	<b>OH3052 H</b>	1500	2800	750	950
	260	440	144	4		<b>23152 MBK</b>	<b>OH3152</b>	2153	3673	700	850
	260	480	130	5		<b>22252 MBK</b>	<b>OH3152 H</b>	2190	3300	750	1000
	260	540	165	6		<b>22352 CK</b>	<b>OH2352 H</b>	3125	4560	600	800
<b>260</b>	280	420	106	4		<b>23056 MBK</b>	<b>OH3056 H</b>	1560	3000	700	900
	280	460	146	5		<b>23156 MBK</b>	<b>OH3156 H</b>	2295	4050	750	1000
	280	500	130	5		<b>22256 MBK</b>	<b>OH3156 H</b>	2330	3600	700	950
	280	500	176	5		<b>23256 MBK</b>	<b>OH2356 H</b>	2806	4645	480	630
	280	580	175	6		<b>22356 CK</b>	<b>OH2356 H</b>	3530	5208	560	750

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions				Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	D <sub>1</sub>	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Adapter Sleeve
mm									[kg]
<b>200</b>	30	126	260	0,26	2,6	3,8	2,5	31	9,90
	35	161	280	0,3	2,3	3,4	2,2	52	15,0
	35	161	280	0,29	2,3	3,4	2,3	61,40	15,0
	35	186	280	0,35	1,9	2,9	1,8	79,50	17,0
	35	186	280	0,36	1,8	2,8	1,8	120	17,0
<b>220</b>	34	133	290	0,25	2,7	4,1	2,7	33,90	12,0
	37	172	300	0,3	2,3	3,4	2,2	66	16,0
	37	172	300	0,29	2,3	3,4	2,3	83,20	16,0
	37	199	300	0,35	1,9	2,9	1,8	109	19,0
	37	199	300	0,31	2,2	3,3	2,2	151	19,0
<b>240</b>	34	145	310	0,26	2,6	3,9	2,6	49	13,5
	38	190	330	0,31	2,2	3,3	2,2	92,50	21,0
	38	190	330	0,29	2,3	3,4	2,3	107	21,0
	38	211	330	0,36	1,8	2,8	1,8	187	21,0
<b>260</b>	38	152	330	0,25	2,7	4,1	2,7	52,50	16,0
	39	195	350	0,3	2,3	3,4	2,2	98,50	23,0
	39	195	350	0,29	2,3	3,4	2,3	113	23,0
	39	224	350	0,35	1,9	2,9	1,8	153	27,0
	39	224	350	0,36	1,8	2,8	1,8	235	27,0

## Spherical Roller Bearings with Adapter Sleeve



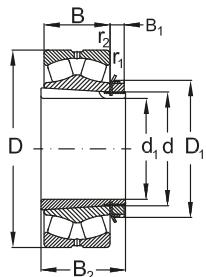
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Bearing	Designation		Basical radial load		Speed limit			
			Adapter Sleeve	Bearing	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>		
mm						kN	min <sup>-1</sup>			
<b>280</b>	300	460	118	4	<b>23060 MBK</b>	<b>OH3060 H</b>	1960	3650	630	800
	300	500	160	5	<b>23160 MBK</b>	<b>OH3160 H</b>	2635	4485	700	950
	300	540	140	5	<b>22260 CAK</b>	<b>OH3160 H</b>	2670	4176	670	900
<b>300</b>	320	480	121	4	<b>23064 MBK</b>	<b>OH3064 H</b>	2040	4000	600	750
	320	540	176	5	<b>23164 MBK</b>	<b>OH3164 H</b>	3115	6000	530	670
	320	580	150	5	<b>22264 CAK</b>	<b>OH3164 H</b>	3150	5100	630	580
	320	580	208	5	<b>23264 MBK</b>	<b>OH3264 H</b>	4130	7026	430	560
<b>320</b>	340	520	133	5	<b>23068 MBK</b>	<b>OH3068 H</b>	2360	4500	560	700
	340	580	190	5	<b>23168 MBK</b>	<b>OH3168 H</b>	3605	6409	630	850
<b>340</b>	360	540	134	5	<b>23072 MBK</b>	<b>OH3072 H</b>	2450	4800	530	670
	360	600	192	5	<b>23172 MBK</b>	<b>OH3172 H</b>	3740	7010	600	800
	360	650	232	6	<b>23272 MBK</b>	<b>OH3272 H</b>	4880	8490	430	560
<b>360</b>	380	560	135	5	<b>23076 MBK</b>	<b>OH3076 H</b>	2550	5300	500	630
	380	620	194	5	<b>23176 MBK</b>	<b>OH3176 H</b>	3740	7540	560	750
	380	680	240	6	<b>23276 MBK</b>	<b>OH3276 H</b>	5050	9660	400	530
<b>380</b>	400	600	148	5	<b>23080 MBK</b>	<b>OH3080 H</b>	3050	6200	450	560
	400	650	200	6	<b>23180 MBK</b>	<b>OH3180 H</b>	4100	7730	530	700
	400	720	256	6	<b>23280 MBK</b>	<b>OH3280 H</b>	5950	10807	380	500
<b>400</b>	420	620	150	5	<b>23084 MBK</b>	<b>OH3084 H</b>	3150	6550	450	560

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft $\Phi d_1$	Dimensions				Calculation factor			Mass	
	$B_1$	$B_2$	$D_1$	$e$	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Adapter Sleeve
mm									[kg]
<b>280</b>	42	168	360	0,25	2,7	4	2,6	73,60	20,5
	40	208	380	0,3	2,3	3,4	2,2	129	29,0
	40	208	380	0,29	2,3	3,4	2,3	142	29,0
<b>300</b>	42	171	380	0,25	2,7	4,1	2,7	79,50	22,0
	42	226	400	0,34	2	3	1,9	172	32,0
	42	226	400	0,29	2,5	3,7	2,5	180	32,0
	42	258	400	0,35	1,9	2,9	1,8	247	35,0
<b>320</b>	45	187	400	0,25	2,7	4	2,6	105	27,0
	55	254	440	0,31	2,2	3,2	2,2	212	50,0
<b>340</b>	45	188	420	0,25	2,7	4,1	2,7	111	29,0
	58	259	460	0,33	2,3	3,4	2,2	220	56,0
	58	299	460	0,35	1,9	2,9	1,8	344	60,5
<b>360</b>	48	193	450	0,25	2,8	4,2	2,8	117	35,5
	60	264	490	0,3	2,3	3,4	2,2	240	61,5
	60	310	490	0,35	1,9	2,9	1,8	375	69,5
<b>380</b>	52	210	470	0,24	2,8	4,1	2,7	152	40,0
	62	272	520	0,28	2,4	3,6	2,5	265	73,0
	62	328	520	0,35	1,9	2,9	1,8	450	87,0
<b>400</b>	52	212	490	0,24	2,8	4,2	2,8	160	47,0

## Spherical Roller Bearings with Adapter Sleeve



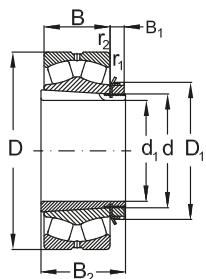
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Bearing	Designation		Basical radial load		Speed limit	
			Adapter Sleeve	Bearing	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>400</b>	420	700	224	6	<b>23184 CK</b>	<b>OH3184 H</b>	4600	9000
	420	760	272	7,5	<b>23284 MBK</b>	<b>OH3284 H</b>	6575	11717
<b>410</b>	440	650	157	6	<b>23088 MBK</b>	<b>OH3088 H</b>	3400	7100
	440	720	226	6	<b>23188 CK</b>	<b>OH3188 H</b>	5250	10000
	440	790	280	7,5	<b>23288 MBK</b>	<b>OH3288 H</b>	7100	13400
<b>430</b>	460	680	163	6	<b>23092 MBK</b>	<b>OH3092 H</b>	3650	7650
	460	760	240	7,5	<b>23192 CK</b>	<b>OH3192 H</b>	5760	11025
	460	830	296	7,5	<b>23292 MBK</b>	<b>OH3292 H</b>	7560	13970
<b>450</b>	480	700	165	6	<b>23096 MBK</b>	<b>OH3096 H</b>	3800	8150
	480	790	248	7,5	<b>23196 CK</b>	<b>OH3196 H</b>	5800	11800
	480	870	310	7,5	<b>23296 MBK</b>	<b>OH3296 H</b>	8800	17000
<b>470</b>	500	670	128	5	<b>239/500 MBK</b>	<b>H39/500</b>	2500	6090
	500	720	167	6	<b>230/500 MBK</b>	<b>OH30/500 H</b>	3900	8500
	500	830	264	7,5	<b>231/500 MBK</b>	<b>OH31/500 H</b>	6550	13200
	500	920	336	7,5	<b>232/500 MBK</b>	<b>OH32/500 H</b>	9650	18300
<b>500</b>	530	710	136	5	<b>239/530 MBK</b>	<b>H39/530</b>	2980	6755
	530	780	185	6	<b>230/530 MBK</b>	<b>OH30/530 H</b>	4400	9500
<b>530</b>	560	750	140	5	<b>239/560 MBK</b>	<b>OH39/560 H</b>	3100	7650
	560	820	195	6	<b>230/560 MBK</b>	<b>OH30/560 H</b>	5100	11000

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft	Dimensions				Calculation factor			Mass		
	$\Phi d_1$	$B_1$	$B_2$	$D_1$	e	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Adapter Sleeve
<b>mm</b>										[kg]
<b>400</b>	70	304	540	0,33	2	3	2	363	80,0	
	70	352	540	0,35	1,9	2,9	1,8	540	96,0	
<b>410</b>	60	228	520	0,24	2,8	4,2	2,8	184	65,0	
	70	307	560	0,3	2,3	3,4	2,2	380	95,0	
	70	361	560	0,35	1,9	2,9	1,8	595	117	
<b>430</b>	60	234	540	0,24	2,8	4,2	2,8	210	71,0	
	75	326	580	0,3	2,3	3,4	2,2	441	119	
	75	382	580	0,35	1,9	2,9	1,9	715	134	
<b>450</b>	60	237	560	0,23	2,9	4,3	2,8	220	75,0	
	75	335	620	0,3	2,3	3,4	2,2	485	135	
	75	397	620	0,37	1,8	2,7	1,8	835	153	
<b>470</b>	68	208	580	0,17	3,9	5,8	3,8	130	74,3	
	68	247	580	0,22	3	4,5	2,9	229	82,0	
	80	356	630	0,3	2,3	3,4	2,2	580	145	
	80	428	630	0,38	1,8	2,7	1,7	1010	170	
<b>500</b>	68	216	630	0,18	3,8	5,7	3,8	150	87,9	
	68	265	630	0,22	3	4,5	3	310	105	
<b>530</b>	75	227	650	0,17	4	5,9	3,9	183	95	
	75	282	650	0,23	2,9	4,4	2,9	358	112	

## Spherical Roller Bearings with Adapter Sleeve



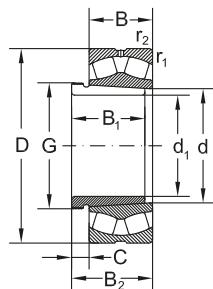
Shaft	Dimensions					Designation		Basical radial load		Speed limit	
	Φd <sub>1</sub>	d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Bearing	Adapter Sleeve	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								kN		min <sup>-1</sup>	
<b>560</b>	600	800	150	5		<b>239/600 MBK</b>	<b>OH39/600 H</b>	3450	8650	320	400
	600	870	200	6		<b>230/600 MBK</b>	<b>OH30/600 H</b>	5700	12500	300	380
<b>600</b>	630	850	165	6		<b>239/630 MBK</b>	<b>OH39/630 H</b>	4290	9910	380	500
	630	920	212	7,5		<b>230/630 MBK</b>	<b>OH30/630 H</b>	6300	14000	260	340
<b>630</b>	670	900	170	6		<b>239/670 MBK</b>	<b>OH39/670 H</b>	4300	10600	280	360
	670	980	230	7,5		<b>230/670 MBK</b>	<b>OH30/670 H</b>	7200	16000	260	340
<b>670</b>	710	950	180	6		<b>239/710 MBK</b>	<b>OH39/710 H</b>	4800	12000	260	340
<b>710</b>	750	1000	185	6		<b>239/750 MBK</b>	<b>OH39/750 H</b>	5200	12900	260	340

## Spherical Roller Bearings with Adapter Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft	Dimensions					Calculation factor			Mass	
	$\Phi d_1$	$B_1$	$B_2$	$D_1$	$e$	$F_a/F_r \leq e$	$F_a/F_r > e$	$Y_0$	Bearing	Adapter Sleeve
<b>mm</b>										[kg]
<b>560</b>	75	239	700	0,17	4	5,9	3,9	221	127	
	75	289	700	0,22	3,1	4,6	3	406	147	
<b>600</b>	75	254	730	0,18	3,8	5,7	3,7	280	124	
	75	301	730	0,22	3	4,5	2,9	520	138	
<b>630</b>	80	264	780	0,17	4	5,9	3,9	326	162	
	80	324	780	0,22	3	4,5	2,9	602	190	
<b>670</b>	90	286	830	0,18	3,8	5,7	3,8	386	183	
<b>710</b>	90	291	870	0,17	4	5,9	3,9	437	211	

## Spherical Roller Bearings with Withdrawal Sleeve



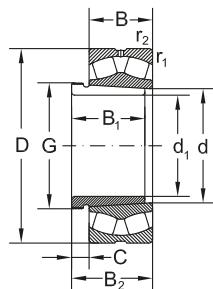
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
		Bearing	Withdrawal Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
<b>35</b>	40	80	23	1,1	<b>22208 CK</b>	<b>AH308</b>	88      98      6000      7500
	40	90	23	1,5	<b>21308 CK</b>	<b>AH308</b>	91,5      100      4500      5600
	40	90	23	1,5	<b>22308 CK</b>	<b>AH2308</b>	129      143      4300      5300
<b>40</b>	45	85	23	1,1	<b>22209 CK</b>	<b>AH309</b>	93      105      5600      7000
	45	100	25	1,5	<b>21309 CK</b>	<b>AH309</b>	108      120      4000      5300
	45	100	36	1,5	<b>22309 CK</b>	<b>AH2309</b>	156      176      3800      4800
<b>45</b>	50	90	23	1,1	<b>22210 CK</b>	<b>AHX310</b>	98      114      4000      5300
	50	110	27	2	<b>21310 CK</b>	<b>AHX310</b>	120      130      3600      4800
	50	110	40	2	<b>22310 CK</b>	<b>AHX2310</b>	190      216      3400      4300
<b>50</b>	55	100	25	1,5	<b>22211 CK</b>	<b>AHX311</b>	120      140      3800      5000
	55	120	29	2	<b>21311 CK</b>	<b>AHX311</b>	135      155      3200      4300
	55	120	43	2	<b>22311 CK</b>	<b>AHX2311</b>	224      255      3000      4000
<b>55</b>	60	110	28	1,5	<b>22212 CK</b>	<b>AHX312</b>	145      175      3400      4500
	60	130	31	2,1	<b>21312 CK</b>	<b>AHX312</b>	150      180      3000      4000
	60	130	46	2,1	<b>22312 CK</b>	<b>AHX2312</b>	260      300      2800      3600
<b>60</b>	65	120	31	1,5	<b>22213 CK</b>	<b>AH313</b>	170      204      3000      4000
	65	140	33	2,1	<b>21313 CK</b>	<b>AH313</b>	196      228      2800      3800
	65	140	48	2,1	<b>22313 CK</b>	<b>AH2313</b>	290      355      2600      3400

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
mm										[kg]
<b>35</b>	29	32	6	M 45x1,5	0,28	2,4	3,6	2,3	0,58	0,09
	29	32	6	M 45x1,5	0,26	2,6	3,9	2,6	0,80	0,09
	40	43	7	M 45x1,5	0,36	1,9	2,8	1,8	1,10	0,13
<b>40</b>	31	34	6	M 50x1,5	0,26	2,6	3,9	2,6	0,65	0,12
	31	34	6	M 50x1,5	0,26	2,6	3,9	2,6	1,06	0,12
	44	47	7	M 50x1,5	0,36	1,9	2,8	1,9	1,4	0,13
<b>45</b>	35	38	7	M 55x2	0,24	2,8	4,2	2,8	0,72	0,13
	35	38	7	M 55x2	0,24	2,8	4,1	2,7	1,35	0,13
	50	53	9	M 55x2	0,36	1,9	2,8	1,8	1,96	0,19
<b>50</b>	37	40	7	M 60x2	0,23	2,9	4,4	2,9	0,96	0,16
	37	40	7	M 60x2	0,24	2,8	4,1	2,7	1,71	0,16
	54	57	10	M 60x2	0,36	1,9	2,8	1,8	2,47	0,26
<b>55</b>	40	43	8	M 65x2	0,24	2,8	4,2	2,8	1,25	0,19
	40	43	8	M 65x2	0,24	2,9	4,3	2,8	2,12	0,19
	58	61	11	M 65x2	0,35	1,9	2,8	1,9	3,09	0,30
<b>60</b>	42	45	8	M 75x2	0,24	2,8	4,2	2,8	1,6	0,25
	42	45	8	M 75x2	0,24	2,8	4,2	2,8	2,67	0,25
	61	64	12	M 75x2	0,34	2	3	2	3,8	0,25

## Spherical Roller Bearings with Withdrawal Sleeve



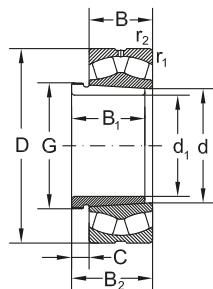
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Withdrawal Sleeve	Basical radial load		Speed limit	
		Bearing			dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>65</b>	70 125 31 1,5	<b>22214 CK</b>	<b>AH314</b>		179	225	3600	4500
	70 150 35 2,1	<b>21314 CK</b>	<b>AH314</b>		207	360	2600	3400
	70 150 51 2,1	<b>22314 CK</b>	<b>AHX2314</b>		325	375	2200	3000
<b>70</b>	75 130 31 1,5	<b>22215 CK</b>	<b>AH315</b>		183	236	2800	3800
	75 160 37 2,1	<b>21315 CK</b>	<b>AH315</b>		250	305	2400	3200
	75 160 55 2,1	<b>22315 CK</b>	<b>AHX2315</b>		375	440	2200	3000
<b>75</b>	80 140 33 2	<b>22216 CK</b>	<b>AH316</b>		208	260	2600	3400
	80 170 39 2,1	<b>21316 CK</b>	<b>AH316</b>		275	340	2200	3000
	80 170 58 2,1	<b>22316 CK</b>	<b>AHX2316</b>		410	500	1800	2400
<b>80</b>	85 150 36 2	<b>22217 CK</b>	<b>AHX317</b>		250	325	2400	3200
	85 180 41 3	<b>21317 CK</b>	<b>AHX317</b>		305	375	2200	2800
	85 180 60 3	<b>22317 CK</b>	<b>AHX2317</b>		455	540	1800	2400
<b>85</b>	90 160 40 2	<b>22218 CK</b>	<b>AHX318</b>		285	360	2200	3000
	90 160 52,4 2	<b>23218 CK</b>	<b>AHX2318</b>		340	485	2200	3000
	90 190 43 3	<b>21318 CK</b>	<b>AHX318</b>		335	415	2200	2800
	90 190 64 3	<b>22318 CK</b>	<b>AH2318</b>		510	620	1800	2400
<b>90</b>	95 170 43 2,1	<b>22219 CK</b>	<b>AHX319</b>		315	400	2200	2800
	95 200 45 3	<b>21319 CK</b>	<b>AHX319</b>		360	450	2000	2600

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
mm										[kg]
<b>65</b>	43	47	8	M 80x2	0,23	2,9	4,4	2,9	1,8	0,28
	43	47	8	M 80x2	0,23	2,9	4,4	2,9	3,23	0,28
	64	68	12	M 80x2	0,34	2	3	2	4,53	0,46
<b>70</b>	45	49	8	M 85x2	0,22	3,1	4,6	3	1,92	0,31
	45	49	8	M 85x2	0,23	2,9	4,4	2,9	3,86	0,31
	68	72	12	M 85x2	0,34	2	3	1,9	5,52	0,53
<b>75</b>	48	52	8	M 90x2	0,22	3,1	4,7	3,1	2,34	0,37
	48	52	8	M 90x2	0,23	2,9	4,4	2,9	4,6	0,37
	71	75	12	M 90x2	0,34	2	3	1,9	6,53	0,60
<b>80</b>	52	56	9	M 95x2	0,22	3	4,5	3	2,9	0,43
	52	56	9	M 95x2	0,22	3	4,5	2,9	5,33	0,43
	74	78	13	M 95x2	0,33	2	3	2	7,48	0,65
<b>85</b>	53	57	9	M 100x2	0,23	2,9	4,3	2,8	3,64	0,46
	63	67	10	M 100x2	0,31	2,2	3,3	2,2	4,85	0,57
	53	57	9	M 100x2	0,22	3	4,5	2,9	6,2	0,46
	79	83	14	M 100x2	0,33	2	3	2	8,83	0,76
<b>90</b>	57	61	10	M 105x2	0,24	2,9	4,3	2,8	4,39	0,54
	57	61	10	M 105x2	0,22	3	4,5	3	7,16	0,54

## Spherical Roller Bearings with Withdrawal Sleeve



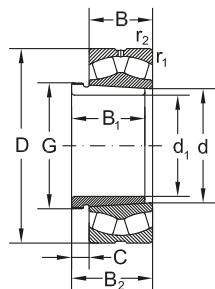
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Withdrawal Sleeve	Basical radial load		Speed limit	
		Bearing			dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm						kN	min <sup>-1</sup>	
<b>90</b>	95 200 67 3	<b>22319 CK</b>	<b>AHX2319</b>		580	700	1700	2200
<b>95</b>	100 165 52 2	<b>23120 MBK</b>	<b>AHX3120</b>		355	540	2000	3000
	100 180 46 2,1	<b>22220 CK</b>	<b>AHX320</b>		360	465	2200	2800
	100 180 60,3 2,1	<b>23220 CK</b>	<b>AHX2320</b>		465	655	1700	2200
	100 215 73 3	<b>22320 CK</b>	<b>AHX2320</b>		655	815	1500	2000
<b>105</b>	110 180 56 2	<b>23122 MBK</b>	<b>AHX3122</b>		410	640	1800	2400
	110 180 69 2	<b>24122 CK30</b>	<b>AH24122</b>		520	880	1200	1600
	110 200 53 2,1	<b>22222 CK</b>	<b>AHX3122</b>		455	585	2000	2800
	110 200 69,8 2,1	<b>23222 CK</b>	<b>AHX3222</b>		620	850	1400	1800
	110 240 80 3	<b>22322 MBK</b>	<b>AHX2322</b>		800	1060	1400	1900
<b>115</b>	120 180 46 2	<b>23024 CK</b>	<b>AHX3024</b>		360	570	2200	3000
	120 180 60 2	<b>24024 CK30</b>	<b>AH24024</b>		455	800	1500	2000
	120 200 62 2	<b>23124 MBK</b>	<b>AHX3124</b>		495	770	1700	2200
	120 200 80 2	<b>24124 CK30</b>	<b>AH24124</b>		630	1050	1000	1300
	120 215 58 2,1	<b>22224 CK</b>	<b>AHX3124</b>		540	720	1700	2200
	120 215 76 2,1	<b>23224 CK</b>	<b>AHX3224</b>		680	1000	1300	1700
	120 260 86 3	<b>22324 MBK</b>	<b>AHX2324</b>		900	1400	1300	1700
<b>125</b>	130 200 52 2	<b>23026 CK</b>	<b>AHX3026</b>		455	720	1900	2600
	130 200 69 2	<b>24026 CK30</b>	<b>AH24026</b>		530	900	1200	1600

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft $\Phi d_1$	Dimensions					Calculation factor			Mass	
	$B_1$	$B_2$	$C$	$G$	$e$	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Withdrawal Sleeve
mm										[kg]
<b>90</b>	85	89	16	M 105x2	0,33	2	3	2	10,2	0,90
<b>95</b>	64	68	11	M 110x2	0,28	2,4	3,5	2,3	4,87	0,66
	59	63	10	M 110x2	0,24	2,8	4,2	2,8	5,27	0,58
	73	77	11	M 110x2	0,31	2,2	3,3	2,1	7,06	0,76
	90	94	16	M 110x2	0,34	2	3	2	13	1,00
<b>105</b>	68	72	11	M 120x2	0,28	2,4	3,6	2,3	6,07	0,76
	82	91	13	M 115x2	0,35	1,9	2,9	1,9	7,65	0,73
	68	72	11	M 120x2	0,25	2,7	4	2,7	7,46	0,76
	82	86	11	M 120x2	0,33	2,1	3,1	2	10,1	0,88
	98	102	16	M 125x2	0,33	2,1	3,1	2	18,4	1,35
<b>115</b>	60	64	13	M 130x2	0,22	3	4,5	3	4,61	0,75
	73	82	13	M 125x2	0,29	2,3	3,4	2,3	5,85	0,65
	75	79	12	M 130x2	0,28	2,4	3,6	2,3	8,33	0,94
	93	102	13	M 130x2	0,37	1,8	2,7	1,8	11	1,00
	75	79	12	M 125x2	0,25	2,7	4	2,7	9,39	0,94
	90	94	13	M 135x2	0,33	2	3	2	12,5	1,11
	105	109	17	M 135x2	0,33	2,1	3,1	2	22,6	1,65
<b>125</b>	67	71	14	M 140x2	0,23	2,9	4,4	2,9	6,54	0,93
	83	93	14	M 135x2	0,31	2,2	3,3	2,2	8,56	0,84

## Spherical Roller Bearings with Withdrawal Sleeve



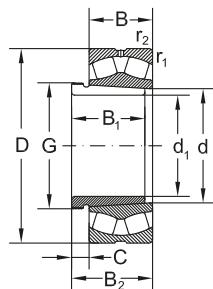
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Withdrawal Sleeve	Basical radial load		Speed limit	
		Bearing			dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>125</b>	130 210 64 2	<b>23126 MBK</b>	<b>AHX3126</b>		540	860	1500	2000
	130 210 80 2	<b>24126 CK30</b>	<b>AH24126</b>		650	1100	900	1200
	130 230 64 3	<b>22226 CK</b>	<b>AHX3126</b>		630	880	1700	2200
	130 230 80 3	<b>23226 CK</b>	<b>AHX3226</b>		765	1140	1300	1700
	130 280 93 4	<b>22326 MBK</b>	<b>AHX2326</b>		1040	1340	1200	1600
<b>135</b>	140 210 53 2	<b>23028 CK</b>	<b>AHX3028</b>		480	780	1900	2600
	140 210 69 2	<b>24028 CK30</b>	<b>AH24028</b>		550	990	1100	1500
	140 225 68 2,1	<b>23128 MBK</b>	<b>AHX3128</b>		600	990	1400	1800
	140 225 85 2,1	<b>24128 CK30</b>	<b>AH24128</b>		740	1380	1100	1500
	140 250 68 3	<b>22228 CK</b>	<b>AHX3128</b>		730	1080	1400	1900
	140 250 88 3	<b>23228 CK</b>	<b>AHX3228</b>		915	1370	1100	1400
	140 300 102 4	<b>22328 MBK</b>	<b>AHX2328</b>		1220	1600	1100	1400
<b>145</b>	150 225 56 2,1	<b>23030 CK</b>	<b>AHX3030</b>		530	865	1800	2400
	150 225 75 2,1	<b>24030 CK30</b>	<b>AH24030</b>		620	1140	1300	1700
	150 250 80 2,1	<b>23130 MBK</b>	<b>AHX3130</b>		800	1320	1300	1700
	150 250 100 2,1	<b>24130 CK30</b>	<b>AH24130</b>		915	1560	1100	1500
	150 270 73 3	<b>22230 CK</b>	<b>AHX3130</b>		850	1200	1400	1800
	150 270 96 3	<b>23230 CK</b>	<b>AHX3230</b>		1030	1610	1000	1300
	150 320 108 4	<b>22330 MBK</b>	<b>AHX2330</b>		1370	1830	1100	1500

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
mm										[kg]
<b>125</b>	78	82	12	M 140X2	0,28	2,4	3,6	2,4	9,19	1,10
	94	104	14	M 140X2	0,34	2	2,9	1,9	11,7	1,11
	78	82	12	M 140X2	0,26	2,6	3,9	2,6	11,6	1,10
	98	102	15	M 145X2	0,33	2,1	3,1	2	15	1,55
	115	119	19	M 145X2	0,33	2,1	3,1	2	28	2,00
<b>135</b>	68	73	14	M 150X2	0,22	3,1	4,6	3	7,05	1,00
	83	93	14	M 145X2	0,29	2,3	3,5	2,3	9,06	0,95
	83	88	14	M 150X2	0,27	2,5	3,7	2,4	11,1	1,30
	99	109	14	M 150X2	0,34	2	2,9	1,9	14,1	1,30
	83	88	14	M 150X2	0,25	2,7	4	2,6	14,7	1,30
	104	109	15	M 155X3	0,33	2	3	2	19,5	1,85
	125	130	20	M 155X2	0,34	2	3	2	35,1	2,35
<b>145</b>	72	77	15	M 160X3	0,22	3,1	4,6	3	8,48	1,15
	90	101	15	M 155X3	0,29	2,3	3,5	2,3	11,2	1,05
	96	101	15	M 165X3	0,29	2,3	3,5	2,3	16,8	1,80
	115	126	15	M 160X3	0,4	1,7	2,5	1,6	21,5	1,55
	96	101	15	M 165X3	0,25	2,7	3,4	2,6	18,7	1,80
	114	119	17	M 165X3	0,33	2	3	2	25	2,20
	135	140	24	M 165X3	0,33	2	3	2	42,1	2,80

## Spherical Roller Bearings with Withdrawal Sleeve



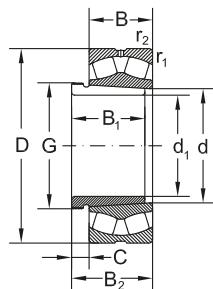
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit				
		Bearing	Withdrawal Sleeve			grease min <sup>-1</sup>	oil min <sup>-1</sup>			
mm										
<b>150</b>	160	240	60	2,1	<b>23032 CK</b>	<b>AH3032</b>	600	1000	1600	2000
	160	240	80	2,1	<b>24032 CK30</b>	<b>AH24032</b>	720	1320	1000	1300
	160	270	86	2,1	<b>23132 MBK</b>	<b>AH3132</b>	930	1510	1200	1600
	160	270	109	2,1	<b>24132 CK30</b>	<b>AH24132</b>	1060	1800	1000	1400
	160	290	80	3	<b>22232 CK</b>	<b>AH3132</b>	965	1370	1300	1700
	160	290	104	3	<b>23232 CK</b>	<b>AH3232</b>	1180	1830	1200	1600
	160	340	114	4	<b>22332 MBK</b>	<b>AH2332</b>	1430	1900	1000	1300
<b>160</b>	170	260	67	2,1	<b>23034 CK</b>	<b>AH3034</b>	735	1200	1500	1900
	170	260	90	2,1	<b>24034 MBK30</b>	<b>AH24034</b>	850	1560	1000	1300
	170	280	88	2,1	<b>23134 MBK</b>	<b>AH3134</b>	990	1650	1100	1500
	170	280	109	2,1	<b>24134 CK30</b>	<b>AH24134</b>	1060	1830	750	1000
	170	310	86	4	<b>22234 CK</b>	<b>AH334</b>	1100	1530	1200	1600
	170	310	110	4	<b>23234 CK</b>	<b>AH2334</b>	1370	2120	1100	1500
	170	360	120	4	<b>22334 MBK</b>	<b>AH2334</b>	1600	2120	900	1200
<b>170</b>	180	280	74	2,1	<b>23036 CK</b>	<b>AH3036</b>	865	1430	1400	1800
	180	280	100	2,1	<b>24036 MBK30</b>	<b>AH24036</b>	1000	1830	900	1200
	180	300	96	3	<b>23136 CK</b>	<b>AH3136</b>	1160	1930	1100	1400
	180	300	118	3	<b>24136 CK30</b>	<b>AH24136</b>	1250	2200	700	950
	180	320	86	4	<b>22236 CK</b>	<b>AH2236</b>	1010	1560	1100	1500

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
mm										[kg]
<b>150</b>	77	82	16	M 170X3	0,22	3,1	4,6	3	11	2,05
	95	106	15	M 170X3	0,29	2,3	3,4	2,3	14,6	2,30
	103	108	16	M 180X3	0,29	2,3	3,5	2,3	22	2,87
	124	135	15	M 170X3	0,41	1,7	2,5	1,6	28,4	3,05
	103	108	16	M 180X3	0,26	2,6	3,9	2,6	24,6	2,87
	124	130	20	M 180X3	0,34	2	3	2	33,9	4,00
	140	146	24	M 180X3	0,37	1,8	2,7	1,8	55,8	4,72
<b>160</b>	85	90	17	M 180X3	0,23	3	4,4	2,9	14,5	2,40
	106	117	16	M 180X3	0,34	2	3	2	20,6	2,70
	104	109	16	M 190X3	0,28	2,4	3,5	2,3	23,6	3,04
	125	136	16	M 180X3	0,39	1,7	2,6	1,7	29,6	3,25
	104	109	16	M 190X3	0,26	2,6	3,9	2,5	29,2	3,04
	134	140	24	M 190X3	0,33	2	3	2	39,7	4,80
	146	152	24	M 190X3	0,37	1,8	2,7	1,8	65	5,25
<b>170</b>	92	98	17	M 190X3	0,23	2,9	4,3	2,8	18,6	2,80
	116	127	16	M 190X3	0,36	1,9	2,8	1,9	26,5	3,20
	116	122	19	M 200X3	0,29	2,3	3,5	2,3	29,7	3,76
	134	145	16	M 190X3	0,4	1,7	2,5	1,6	37,5	3,68
	105	110	17	M 200X3	0,26	2,6	3,9	2,5	37,5	5,25

## Spherical Roller Bearings with Withdrawal Sleeve



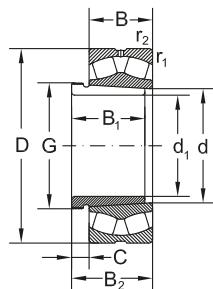
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Withdrawal Sleeve	Basical radial load		Speed limit	
		Bearing			dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>170</b>	180 320 112 4	<b>23236 CK</b>	<b>AH3236</b>		1420	2320	1100	1500
	180 380 126 4	<b>22336 MBK</b>	<b>AH2336</b>		1760	2360	850	1100
<b>180</b>	190 290 75 2,1	<b>23038 CK</b>	<b>AH3038</b>		915	1530	1300	1700
	190 290 100 2,1	<b>24038 MBK30</b>	<b>AH24038</b>		1040	1960	850	1100
	190 320 104 3	<b>23138 MBK</b>	<b>AH3138</b>		1320	2200	1100	1400
	190 320 128 3	<b>24138 CK30</b>	<b>AH24138</b>		1400	2500	670	900
	190 340 92 4	<b>22238 CK</b>	<b>AH2238</b>		1200	1830	1100	1400
	190 340 120 4	<b>23238 CK</b>	<b>AH3238</b>		1750	2880	850	1100
	190 400 132 5	<b>22338 MBK</b>	<b>AH2338</b>		1860	2500	750	1000
<b>190</b>	200 310 82 2,1	<b>23040 CK</b>	<b>AH3040</b>		1060	1760	1300	1700
	200 310 109 2,1	<b>24040 K30</b>	<b>AH24040</b>		1140	2280	850	1100
	200 340 112 3	<b>23140 MBK</b>	<b>AH3140</b>		1320	2280	900	1400
	200 340 140 3	<b>24140 CK30</b>	<b>AH24140</b>		1700	3000	800	1000
	200 360 98 4	<b>22240 CK</b>	<b>AH2240</b>		1250	1930	1100	1400
	200 360 128 4	<b>23240 CK</b>	<b>AH3240</b>		1620	2590	750	1000
	200 420 138 5	<b>22340 MBK</b>	<b>AH2340</b>		1910	2750	670	900
<b>200</b>	220 340 90 3	<b>23044 MBK</b>	<b>AH3044</b>		1100	2000	900	1200
	220 340 118 3	<b>24044 K30</b>	<b>AH24044</b>		1370	2600	750	950
	220 370 150 4	<b>24144 K30</b>	<b>AH24144</b>		1800	3300	700	900

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
<b>mm</b>										[kg]
<b>170</b>	140	146	25	M 200x3	0,33	2,1	3,1	2	42,6	5,32
	154	160	26	M 200x3	0,37	1,8	2,7	1,8	75,2	5,83
<b>180</b>	96	102	18	Tr 205x4	0,23	3	4,4	2,9	20,1	3,32
	118	131	18	M 200x3	0,34	2	3	2	28	3,55
	125	131	20	Tr 210x4	0,3	2,3	3,4	2,2	37,5	4,90
	146	159	18	M 200x3	0,41	1,7	2,5	1,6	46,2	4,28
	112	117	18	Tr 210x4	0,26	2,6	3,9	2,5	35,5	4,25
	145	152	25	Tr 210x4	0,36	1,9	2,8	1,8	53,9	5,90
	160	167	26	Tr 210x4	0,37	1,8	2,7	1,8	87,8	6,63
<b>190</b>	102	108	19	Tr 215x4	0,23	2,9	4,3	2,8	25,3	3,85
	127	140	18	Tr 210x4	0,35	1,9	2,9	1,9	35,2	4,00
	134	140	21	Tr 220x4	0,35	2	2,9	1,9	48,2	5,49
	158	171	18	Tr 210x4	0,42	1,6	2,4	1,6	57,6	5,05
	118	223	19	Tr 220x4	0,26	2,6	3,9	2,5	42,5	4,70
	153	160	24	Tr 220x4	0,37	1,8	2,7	1,8	64,3	6,60
	170	177	30	Tr 220x4	0,36	1,9	2,8	1,8	99,3	7,60
<b>200</b>	111	117	20	Tr 235x4	0,26	2,6	3,8	2,5	38,4	7,40
	138	152	20	Tr 230x4	0,34	2	2,9	1,9	49	8,20
	170	164	20	Tr 230x4	0,41	1,6	2,4	1,6	75,5	10,00

## Spherical Roller Bearings with Withdrawal Sleeve



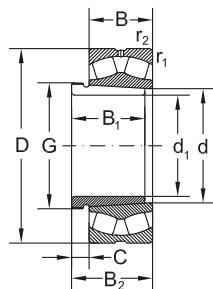
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Bearing	Designation		Basical radial load		Speed limit	
			Withdrawal Sleeve		dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>200</b>	220	370	120	4	<b>23144 MBK</b>	<b>AH3144</b>	1515	2509
	220	400	108	4	<b>22244 CK</b>	<b>AH3144</b>	1520	2300
	220	400	144	4	<b>23244 CK</b>	<b>AH2344</b>	2040	3380
	220	460	145	5	<b>22344 CK</b>	<b>AH2344</b>	2320	3350
<b>220</b>	240	360	92	3	<b>23048 MBK</b>	<b>AH3048</b>	1160	2200
	240	360	118	3	<b>24048 K30</b>	<b>AH24048</b>	1460	2841
	240	400	160	4	<b>24148 K30</b>	<b>AH24148</b>	1780	3109
	240	400	128	4	<b>23148 MBK</b>	<b>AH3148</b>	1705	2863
	240	440	120	4	<b>22248 CK</b>	<b>AH3148</b>	1845	2763
	240	440	160	4	<b>23248 CK</b>	<b>AH2348</b>	2450	4250
	240	500	155	5	<b>22348 MBK</b>	<b>AH2348</b>	2650	3900
<b>240</b>	260	400	104	4	<b>23052 MBK</b>	<b>AH3052</b>	1500	2800
	260	400	140	4	<b>24052 K30</b>	<b>AH24052</b>	1775	3494
	260	440	180	4	<b>24152 K30</b>	<b>AH24152</b>	2500	5000
	260	440	144	4	<b>23152 MBK</b>	<b>AH3152</b>	2153	3673
	260	480	130	5	<b>22252 MBK</b>	<b>AH2252</b>	2190	3300
	260	540	165	6	<b>22352 CK</b>	<b>AH2352</b>	3000	4400
<b>260</b>	280	420	106	4	<b>23056 MBK</b>	<b>AH3056</b>	1560	3000
	280	420	140	4	<b>24056 K30</b>	<b>AH24056</b>	2000	4000

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
<b>mm</b>										[kg]
<b>200</b>	145	151	23	Tr 240x4	0,33	2	3	2	64,8	10,4
	145	151	23	Tr 240x4	0,27	2,5	3,7	2,5	59	9,30
	181	189	30	Tr 240x4	0,37	1,8	2,7	1,8	95	13,5
	181	189	30	Tr 240x4	0,35	2	2,9	1,9	133	13,5
<b>220</b>	116	123	21	Tr 260x4	0,25	2,7	4,1	2,7	42,7	8,75
	138	153	20	Tr 250x4	0,32	2,1	3,1	2,1	52,6	9
	180	195	20	Tr 260x4	0,41	1,7	2,5	1,6	93,1	12,5
	154	161	25	Tr 260x4	0,33	2,1	3,1	2	78,4	12,00
	154	161	25	Tr 260x4	0,27	2,5	3,7	2,5	82,5	12,00
	189	197	30	Tr 260x4	0,37	1,8	2,7	1,8	125	15,5
	189	197	30	Tr 260x4	0,35	2	2,9	1,9	169	15,5
<b>240</b>	128	135	23	Tr 280x4	0,26	2,6	3,9	2,6	59,7	10,7
	162	178	22	Tr 270x4	0,35	1,9	2,9	1,9	77,8	11,8
	202	218	22	Tr 280x4	0,42	1,6	2,4	1,6	129	15,4
	172	179	26	Tr 290x4	0,33	2	3	2	109	16,00
	155	179	26	Tr 290x4	0,27	2,5	3,7	2,5	105	12,5
	205	213	30	Tr 290x4	0,34	2	3	2	205	19,6
<b>260</b>	131	139	24	Tr 300x4	0,25	2,7	4,1	2,7	64,5	12
	162	179	22	Tr 290x4	0,33	2	3	2	83,1	12,8

## Spherical Roller Bearings with Withdrawal Sleeve



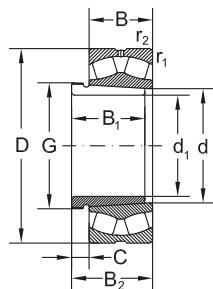
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Bearing	Designation Withdrawal Sleeve	Basical radial load		Speed limit	
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm							
<b>260</b>	280	460	146	5	<b>23156 MBK</b>	<b>AH3156</b>	2295    4050    630    800
	280	460	180	5	<b>24156 K30</b>	<b>AH24156</b>	2635    4848    400    530
	280	500	176	5	<b>23256 MBK</b>	<b>AH2356</b>	2806    4645    480    630
	280	580	175	6	<b>22356 CK</b>	<b>AH2356</b>	3530    5208    530    670
<b>280</b>	300	460	118	4	<b>23060 MBK</b>	<b>AH3060</b>	1960    3650    630    800
	300	460	160	4	<b>24060 K30</b>	<b>AH24060</b>	2385    4702    560    700
	300	500	160	5	<b>23160 MBK</b>	<b>AH3160</b>	2635    4485    600    750
	300	500	200	5	<b>24160 K30</b>	<b>AH24160</b>	3213    6011    430    560
<b>300</b>	320	480	121	4	<b>23064 MBK</b>	<b>AH3064</b>	2040    4000    600    750
	320	480	160	4	<b>24064 K30</b>	<b>AH24064</b>	2500    5240    530    670
	320	540	176	5	<b>23164 MBK</b>	<b>AH3164</b>	3115    6000    530    670
	320	540	218	5	<b>24164 K30</b>	<b>AH24164</b>	3750    7300    400    530
	320	580	208	5	<b>23264 MBK</b>	<b>AH3264</b>	3900    6950    430    560
<b>320</b>	340	520	133	5	<b>23068 MBK</b>	<b>AH3068</b>	2360    4500    560    700
	340	520	180	5	<b>24068 K30</b>	<b>AH24068</b>	3100    6550    480    600
	340	580	190	5	<b>23168 MBK</b>	<b>AH3168</b>	3605    6409    500    630
	340	580	243	5	<b>24168 K30</b>	<b>AH24168</b>	4400    8500    450    560
<b>340</b>	360	540	134	5	<b>23072 MBK</b>	<b>AH3072</b>	2450    4800    530    670
	360	540	180	5	<b>24072 K30</b>	<b>AH24072</b>	3110    6530    480    630

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft	Dimensions					Calculation factor			Mass		
	$\Phi d_1$	$B_1$	$B_2$	C	G	e	$F_a/F_r \leq e$ $Y_1$	$F_a/F_r > e$ $Y_2$	$Y_0$	Bearing	Withdrawal Sleeve
mm	[kg]										
<b>260</b>	175	183	28	Tr 310x5	0,32	2,1	3,2	2,1	117	17,5	
	202	219	22	Tr 300x4	0,39	1,7	2,5	1,7	134	16,3	
	212	220	30	Tr 310x5	0,33	1,9	2,8	1,8	174	21,6	
	212	220	30	Tr 310x5	0,33	2	3	2	254	21,6	
<b>280</b>	145	153	26	Tr 320x5	0,25	2,7	4	2,6	88	14,4	
	184	202	24	Tr 310x5	0,35	2	2,9	1,9	116	15,5	
	192	200	30	Tr 330x5	0,33	2,1	3,1	2	151	20,8	
	224	242	24	Tr 320x5	0,4	1,7	2,5	1,6	179	19,5	
<b>300</b>	149	157	27	Tr 345x5	0,25	2,7	4,1	2,7	96	16	
	184	202	24	Tr 330x5	0,33	2,1	3,1	2	123	16,6	
	209	217	31	Tr 350x5	0,34	2	2,9	1,9	196	24,5	
	242	260	24	Tr 340x5	0,41	1,7	2,5	1,6	225	21,4	
	246	254	36	Tr 350x5	0,37	1,8	2,7	1,8	278	30,6	
<b>320</b>	162	171	28	Tr 365x5	0,25	2,7	4	2,6	125	19,5	
	206	225	26	Tr 360x5	0,34	2	2,9	1,9	165	21,7	
	225	234	33	Tr 370x5	0,34	2	2,9	1,9	245	29	
	269	288	26	Tr 360x5	0,43	1,6	2,3	1,5	293	27,1	
<b>340</b>	167	176	30	Tr 385x5	0,25	2,7	4,1	2,7	132	21	
	206	226	26	Tr 380x5	0,31	2,7	3,3	2,2	140	20,0	

## Spherical Roller Bearings with Withdrawal Sleeve



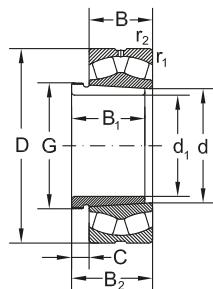
Shaft Φd <sub>1</sub>	Dimensions d	D	B	r <sub>1</sub> , r <sub>2</sub> min.	Designation		Basical radial load dyn. C <sub>r</sub>	Basical radial load stat. C <sub>0r</sub>	Speed limit	
					Bearing	Withdrawal Sleeve			grease	oil
							kN	min <sup>-1</sup>	min <sup>-1</sup>	min <sup>-1</sup>
<b>340</b>	360	600	192	5	<b>23172 MBK</b>	<b>AH3172</b>	3740	7010	480	600
	360	600	243	5	<b>24172 K30</b>	<b>AH24172</b>	4500	9000	430	530
	360	650	232	6	<b>23272 MBK</b>	<b>AH3272</b>	4880	8490	430	560
<b>360</b>	380	560	135	5	<b>23076 MBK</b>	<b>AH3076</b>	2550	5300	500	630
	380	560	180	5	<b>24076 K30</b>	<b>AH24076</b>	3150	6710	450	600
	380	620	194	5	<b>23176 MBK</b>	<b>AH3176</b>	3740	7540	450	560
	380	620	243	5	<b>24176 K30</b>	<b>AH24176</b>	4650	9500	400	500
	380	680	240	6	<b>23276 MBK</b>	<b>AH3276</b>	5050	9660	400	530
<b>380</b>	400	600	148	5	<b>23080 MBK</b>	<b>AH3080</b>	3050	6200	450	560
	400	600	200	5	<b>24080 CAK30</b>	<b>AH24080</b>	3610	7545	430	460
	400	650	200	6	<b>23180 MBK</b>	<b>AH3180</b>	4100	7730	430	530
	400	650	250	6	<b>24180 K30</b>	<b>AH24180</b>	5100	10400	380	480
	400	720	256	6	<b>23280 MBK</b>	<b>AH3280</b>	5700	10800	380	500
<b>400</b>	420	620	150	5	<b>23084 MBK</b>	<b>AH3084</b>	3150	6550	450	560
	420	620	200	5	<b>24084 K30</b>	<b>AH24084</b>	3740	8800	380	480
	420	700	224	6	<b>23184 CK</b>	<b>AH3184</b>	4600	9000	400	500
	420	700	280	6	<b>24184 K30</b>	<b>AH24184</b>	6100	12500	360	450
	420	760	272	7,5	<b>23284 MBK</b>	<b>AH3284</b>	6550	11717	360	480

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
mm										[kg]
<b>340</b>	229	238	35	Tr 400x5	0,33	2,1	3,1	2	261	33
	269	289	26	Tr 380x5	0,41	1,6	2,4	1,6	308	29,6
	274	283	40	Tr 400x5	0,38	1,8	2,7	1,7	389	41,5
<b>360</b>	170	180	31	Tr 410x5	0,24	2,8	4,2	2,8	140	23,5
	208	228	28	Tr 400x5	0,3	2,3	3,4	2,2	145	23,5
	232	242	36	Tr 420x5	0,32	2,1	3,2	2,1	278	36,0
	271	291	28	Tr 400x5	0,39	1,7	2,5	1,7	321	31,0
	284	294	42	Tr 420x5	0,37	1,8	2,7	1,8	436	45,5
<b>380</b>	183	193	33	Tr 430x5	0,24	2,8	4,1	2,7	179	27,0
	228	248	28	Tr 420x5	0,3	2,3	3,4	2,2	200	27,0
	240	250	38	Tr 440x5	0,31	2,2	3,2	2,1	310	39,0
	278	298	28	Tr 420x5	0,39	1,7	2,6	1,7	360	35,0
	302	312	44	Tr 440x5	0,38	1,8	2,7	1,7	517	51,5
<b>400</b>	186	196	34	Tr 450x5	0,24	2,8	4,2	2,8	189	29,0
	230	252	30	Tr 440x5	0,3	2,3	3,4	2,2	205	29,0
	266	276	40	Tr 460x5	0,33	2	3	2	409	46,0
	310	332	30	Tr 440x5	0,4	1,7	2,5	1,6	483	40,3
	321	331	46	Tr 460x5	0,38	1,8	2,6	1,7	612	58,9

## Spherical Roller Bearings with Withdrawal Sleeve



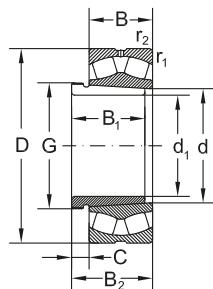
Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Bearing	Designation Withdrawal Sleeve	Basical radial load		Speed limit				
				dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>			
mm										
<b>420</b>	440	650	157	6	<b>23088 MBK</b>	<b>AHX3088</b>	3400	7100	430	530
	440	650	212	6	<b>24088 K30</b>	<b>AHX24088</b>	4080	8800	360	450
	440	720	226	6	<b>23188 CK</b>	<b>AHX3188</b>	5000	10000	400	500
	440	720	280	6	<b>24188 K30</b>	<b>AHX24188</b>	6400	13200	340	430
	440	790	280	7,5	<b>23288 MBK</b>	<b>AHX3288</b>	7100	13400	360	450
<b>440</b>	460	680	163	6	<b>23092 MBK</b>	<b>AHX3092</b>	3650	7650	400	500
	460	760	240	7,5	<b>23192 CK</b>	<b>AHX3192</b>	5760	11025	360	450
	460	760	300	7,5	<b>24192 K30</b>	<b>AH24192</b>	7250	14600	280	380
	460	830	296	7,5	<b>23292 MBK</b>	<b>AHX3292</b>	7560	13970	340	430
<b>460</b>	480	700	165	6	<b>23096 MBK</b>	<b>AHX3096</b>	3800	8150	380	480
	480	790	248	7,5	<b>23196 CK</b>	<b>AHX3196</b>	5800	11800	360	450
	480	790	308	7,5	<b>24196 K30</b>	<b>AH24196</b>	7250	15000	280	360
	480	870	310	7,5	<b>23296 MBK</b>	<b>AHX3296</b>	8800	17000	340	430
<b>480</b>	500	670	128	5	<b>239/500 MBK</b>	<b>AH39/500</b>	2500	6090	380	480
	500	720	167	6	<b>230/500 MBK</b>	<b>AHX30/500</b>	3900	8500	380	480
	500	830	264	7,5	<b>231/500 MBK</b>	<b>AHX31/500</b>	6550	13200	340	430
	500	830	325	7,5	<b>241/500 K30</b>	<b>AH241/500</b>	8630	17000	268	340
	500	920	336	7,5	<b>232/500 MBK</b>	<b>AHX32/500</b>	9650	18300	320	400
<b>500</b>	530	710	136	5	<b>239/530 MBK</b>	<b>AH39/530</b>	2850	6755	360	450

## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
mm										[kg]
<b>420</b>	194	205	35	Tr 470x5	0,24	2,8	4,2	2,8	216	32
	242	264	30	Tr 460x5	0,3	2,3	3,4	2,2	240	32
	270	281	42	Tr 480x5	0,32	2,1	3,1	2,1	429	49,8
	310	332	30	Tr 460x5	0,38	1,8	2,6	1,7	496	42,5
	330	341	48	Tr 480x5	0,37	1,8	2,7	1,8	671	63,8
<b>440</b>	202	213	37	Tr 490x5	0,24	2,8	4,2	2,8	245	35,2
	285	296	43	Tr 510x6	0,32	2,1	3,2	2,1	510	57,9
	332	355	32	Tr 480x6	0,37	1,8	2,7	1,8	550	50
	349	360	50	Tr 510x6	0,37	1,8	2,7	1,8	795	74,5
<b>460</b>	205	217	38	Tr 520x6	0,23	2,9	4,3	2,8	259	39,2
	295	307	45	Tr 530x6	0,32	2,1	3,2	2,1	567	63,1
	340	363	32	Tr 500x6	0,37	1,8	2,7	1,8	595	51,5
	364	376	52	Tr 530x6	0,37	1,8	2,7	1,8	914	82,1
<b>480</b>	162	172	32	Tr 520x6	0,17	3,9	5,8	3,8	161	28
	209	221	40	Tr 540x6	0,22	3	4,5	2,9	272	42,5
	313	325	47	Tr 550x6	0,32	2,1	3,1	2,1	670	70,9
	360	383	35	Tr 530x6	0,37	1,8	2,7	1,8	735	57,0
	393	405	54	Tr 550x6	0,38	1,8	2,7	1,7	1105	94,6
<b>500</b>	175	185	37	Tr 550x6	0,18	3,9	5,7	3,8	202	43,4

## Spherical Roller Bearings with Withdrawal Sleeve



Shaft Φd <sub>1</sub>	Dimensions d D B r <sub>1</sub> , r <sub>2</sub> min.	Designation		Withdrawal Sleeve	Basical radial load		Speed limit	
		Bearing			dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>500</b>	530 780 185 6	<b>230/530 MBK</b>	<b>AH30/530</b>		4400	9500	340	430
	530 870 335 7,5	<b>241/530 K30</b>	<b>AH241/530</b>		8650	18400	240	320
<b>530</b>	560 750 140 5	<b>239/560 MBK</b>	<b>AH39/560</b>		3100	7350	340	430
	560 820 195 6	<b>230/560 MBK</b>	<b>AH30/560</b>		5100	11000	320	400
	560 920 355 7,5	<b>241/560 K30</b>	<b>AH241/560</b>		10500	21600	120	160
<b>560</b>	600 800 150 5	<b>239/600 MBK</b>	<b>AH39/600</b>		3450	8650	320	400
	600 870 200 6	<b>230/600 MBK</b>	<b>AH30/600</b>		5700	12500	300	380
	600 980 375 7,5	<b>241/600 K30</b>	<b>AH241/600</b>		10700	22800	220	280
<b>600</b>	630 580 165 6	<b>239/630 MBK</b>	<b>AH39/630</b>		4050	9800	300	380
	630 920 212 7,5	<b>230/630 MBK</b>	<b>AH30/630</b>		6300	14000	260	340
<b>630</b>	670 900 170 6	<b>239/670 MBK</b>	<b>AH39/670</b>		4300	10600	280	360
	670 980 230 7,5	<b>230/670 MBK</b>	<b>AH30/670</b>		7200	16000	260	340
<b>670</b>	710 950 180 6	<b>239/710 MBK</b>	<b>AH39/710</b>		4800	12000	260	340
<b>710</b>	750 1000 185 6	<b>239/750 MBK</b>	<b>AH39/750</b>		5200	12900	260	340

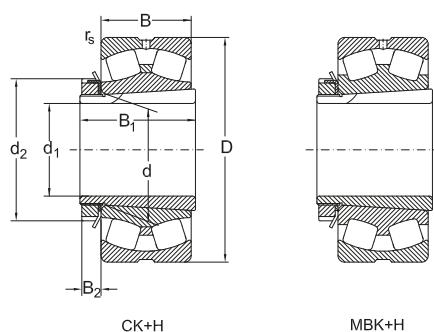
## Spherical Roller Bearings with Withdrawal Sleeve

*Abutment and fillet dimensions for spherical roller bearings see on page 377*

Shaft Φd <sub>1</sub>	Dimensions					Calculation factor			Mass	
	B <sub>1</sub>	B <sub>2</sub>	C	G	e	F <sub>a</sub> /F <sub>r</sub> ≤e Y <sub>1</sub>	F <sub>a</sub> /F <sub>r</sub> >e Y <sub>2</sub>	Y <sub>0</sub>	Bearing	Withdrawal Sleeve
<i>mm</i>										[kg]
<b>500</b>	230	242	45	Tr 560x6	0,22	3	4,5	3	372	61,9
	370	394	35	Tr 550x6	0,37	1,8	2,7	1,8	820	86
<b>530</b>	180	190	37	Tr 580x6	0,17	4	5,9	3,9	230	47,4
	240	252	45	Tr 590x6	0,23	2,9	4,4	2,9	427	68,6
	393	417	38	Tr 580x6	0,35	1,9	2,9	1,8	970	97
<b>560</b>	192	202	38	Tr 625x6	0,17	4	5,9	3,9	277	56,1
	245	259	45	Tr 630x6	0,22	3,1	4,6	3	481	75,4
	413	439	38	Tr 630x6	0,35	1,9	2,9	1,8	1180	120
<b>600</b>	210	232	40	Tr 655x6	0,18	3,8	5,7	3,7	344	62,8
	258	272	46	Tr 670x6	0,22	3	4,5	2,9	576	87,7
<b>630</b>	216	228	41	Tr 695x6	0,17	4	5,9	3,9	412	85,5
	280	294	50	Tr 710x7	0,22	3	4,5	2,9	726	124
<b>670</b>	228	240	43	Tr 740x7	0,18	3,8	5,7	3,8	488	102
<b>710</b>	234	246	44	Tr 780x7	0,17	4	5,9	3,9	548	111

## Spherical Roller Bearings with withdrawal sleeve

SR 3918



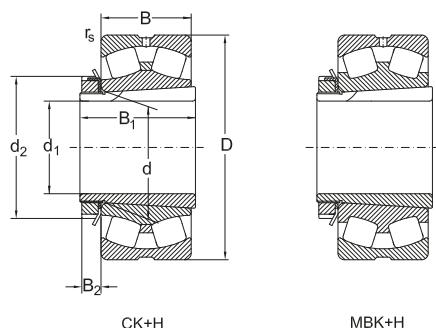
d <sub>1</sub>	d	D	B	r <sub>s</sub> min.	d <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>	Designation		Withdrawal sleeve
								Bearing		
mm										
<b>35</b>	40	80	23	1,1	58	36	10	<b>22208 CK</b>	<b>H308</b>	
	40	90	23	1,5	58	36	10	<b>21308 CK</b>	<b>H308</b>	
	40	90	33	1,5	58	46	10	<b>22308 CK</b>	<b>H2308</b>	
<b>40</b>	45	85	23	1,1	65	39	11	<b>22209 CK</b>	<b>H309</b>	
	45	100	25	1,5	65	39	11	<b>21309 CK</b>	<b>H309</b>	
	45	100	36	1,5	65	50	11	<b>22309 CK</b>	<b>H2309</b>	
<b>45</b>	50	90	23	1,1	70	42	12	<b>22210 CK</b>	<b>H310</b>	
	50	110	27	2	70	42	12	<b>21310 CK</b>	<b>H310</b>	
	50	110	40	2	70	55	12	<b>22310 CK</b>	<b>H2310</b>	
<b>50</b>	55	100	25	1,5	75	45	12	<b>22211 CK</b>	<b>H311</b>	
	55	120	29	2	75	45	12	<b>21311 CK</b>	<b>H311</b>	
	55	120	43	2	75	59	12	<b>22311 CK</b>	<b>H2311</b>	
<b>55</b>	60	110	28	1,5	80	47	13	<b>22212 CK</b>	<b>H312</b>	
	60	130	31	2,1	80	47	13	<b>21312 CK</b>	<b>H312</b>	
	60	130	46	2,1	80	62	13	<b>22312 CK</b>	<b>H2312</b>	
<b>60</b>	65	120	31	1,5	85	50	14	<b>22213 CK</b>	<b>H313</b>	
	65	140	33	2,1	85	50	14	<b>21313 CK</b>	<b>H313</b>	
	65	140	48	2,1	85	65	14	<b>22313 CK</b>	<b>H2313</b>	
	70	125	31	2,1	92	52	14	<b>22214 CK</b>	<b>H314</b>	
	70	150	51	2,1	92	68	14	<b>22314 CK</b>	<b>H2314</b>	
<b>65</b>	75	130	31	1,5	98	55	15	<b>22215 CKW33</b>	<b>H315</b>	
	75	160	37	2,1	98	55	15	<b>21315 CKW33</b>	<b>H315</b>	
	75	160	55	2,1	98	73	15	<b>22315 CKW33</b>	<b>H2315</b>	
<b>70</b>	80	140	33	2	105	59	17	<b>22216 CKW33</b>	<b>H316</b>	
	80	170	39	2,1	105	59	17	<b>21316 CKW33</b>	<b>H316</b>	
	80	170	58	2,1	105	78	17	<b>22316 MBKW33</b>	<b>H2316</b>	
<b>75</b>	85	150	36	2	110	63	18	<b>22217 CKW33</b>	<b>H317</b>	
	85	180	41	3	110	63	18	<b>21317 CK</b>	<b>H317</b>	
	85	180	60	3	110	82	18	<b>22317 MBKW33</b>	<b>H2317</b>	
<b>80</b>	90	160	40	2	120	65	18	<b>22218 CKW33</b>	<b>H318</b>	
	90	160	52,4	2	120	86	18	<b>23218 MBK</b>	<b>H2318</b>	
	90	190	43	3	120	56	18	<b>21318 CK</b>	<b>H318</b>	

## Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit			Mass	
dyn. $C_r$	e	$Y_1$	$Y_2$	stat. $C_{0r}$	$Y_0$	grease	oil	
kN	-	-	-	kN	-	min <sup>-1</sup>	min <sup>-1</sup>	kg
88	0,31	2,2	3,2	98	2,1	4800	6300	0,699
99	0,26	2,6	3,9	120	2,6	4500	6000	0,889
140	0,4	1,6	2,5	145	1,6	4300	5600	1,22
93	0,3	2,3	3,4	105	2,2	4500	6000	0,798
120	0,26	2,6	3,9	135	2,6	4000	5300	1,19
165	0,4	1,7	2,5	190	1,6	3800	5000	1,58
100	0,26	2,6	3,9	120	2,5	4000	5300	0,903
120	0,24	2,8	4,1	130	2,7	3600	4800	1,50
190	0,4	1,7	2,5	220	1,6	3400	4500	2,16
120	0,27	2,5	3,8	140	2,5	3800	5000	1,15
135	0,24	2,8	4,1	155	2,7	3200	4300	1,95
230	0,4	1,7	2,5	265	1,6	3000	4000	2,72
145	1,27	2,5	3,7	175	2,4	3400	4500	1,49
150	0,24	2,9	4,3	180	2,8	3000	4000	2,29
270	0,4	1,7	2,5	320	1,7	2800	3800	3,33
180	0,28	2,4	3,6	220	2,4	3000	4000	1,86
220	0,24	2,8	4,2	290	2,8	2800	3800	2,86
305	0,39	1,7	2,6	360	1,7	2800	3600	4,01
180	0,26	2,6	3,9	225	2,6	2800	3800	2,22
375	0,38	1,8	2,6	455	1,7	2400	3200	5,20
190	0,24	2,8	4,1	250	2,7	2800	3800	2,43
280	0,23	2,9	4,4	360	2,9	2400	3200	4,33
415	0,38	1,8	2,6	520	1,7	2200	3000	6,20
210	0,25	2,6	4	275	2,6	2600	3400	3,08
310	0,23	2,9	4,4	400	2,9	2200	3000	5,23
410	0,25	2,6	4	500	2,6	1800	2400	7,38
250	0,26	2,6	3,9	325	2,6	2400	3200	3,68
350	0,22	3	4,5	450	2,9	2200	2800	6,18
460	0,37	1,8	2,7	570	1,8	1700	2200	8,65
305	0,27	2,5	3,8	410	2,5	2200	3000	4,57
340	0,34	2	3	485	2	1500	2000	6,19
385	0,22	3	4,5	510	2,9	2200	2800	7,07

## Spherical Roller Bearings with withdrawal sleeve

SR 3918



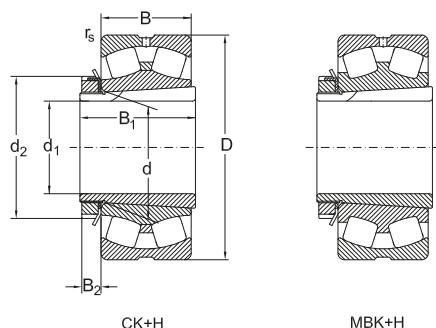
d <sub>1</sub>	d	D	B	r <sub>s</sub> min.	Dimensions			Designation Bearing	Withdrawal sleeve
					d <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>		
mm									
80	90	190	64	3	120	86	18	22318 CKW33	H2318
85	95	170	43	2,1	125	68	19	22219 MBKW33	H319
	95	200	45	3	125	68	19	21319 MBK	H319
	95	200	67	3	125	90	19	22319 MBKW33	H2319
90	100	180	46	2,1	130	71	20	22220 MBKW33	H320
	100	180	60,3	2,1	130	97	20	23220 MAKW33	H2320
	100	215	47	3	130	71	20	21320 MBK	H320
	100	215	73	3	130	97	20	22320 CKW33	H2320
100	110	180	56	2	145	81	21	23122 MBKW33	H3122
	110	200	53	2,1	145	77	21	22222 MBKW33	H322
	110	200	69,8	2,1	145	105	21	23222 MBKW33	H2322
	110	240	50	3	145	77	21	21322 MBK	H322
	110	240	80	3	145	105	21	22322 CKW33	H2322
110	120	180	46	2	145	72	22	23024 MBK33	H3024
	120	200	62	2	155	88	22	23124 MBK33	H3124
	120	215	58	2,1	155	88	22	22224 CKW33	H3124
	120	215	76	2,1	155	112	22	23224 MBKW33	H2324
	120	260	86	3	155	112	22	22324 MBKW33	H2324
115	130	200	52	2	155	80	23	23026 MBKW33	H3026
	130	210	64	2	165	92	23	23126 MBKW33	H3126
	130	230	64	3	165	92	23	22226 CKW33	H3126
	130	230	80	3	165	121	23	23226 MBKW33	H2326
	130	280	93	4	165	121	23	22326 MBKW33	H2326
125	140	210	53	2	165	82	24	23028 MBKW33	H3028
	140	225	68	2,1	180	97	24	23128 MBKW33	H3128
	140	250	68	3	180	97	24	22228 MBKW33	H3128
	140	250	88	3	180	131	24	23228 MBKW33	H2328
	140	300	102	4	180	131	24	22328 MBKW33	H2328
135	150	225	56	2,1	180	87	26	23030 MBKW33	H3030
	150	250	80	2,1	195	111	26	23130 MBKW33	H3130
	150	270	73	3	195	111	26	22230 MBKW33	H3130
	150	270	96	3	195	139	26	23230 MBKW33	H2330

## Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Mass
dyn. $C_r$	e	$Y_1$	$Y_2$	stat. $C_{0r}$	$Y_0$	grease	oil	
kN	-	-	-	kN	-	$\text{min}^{-1}$	$\text{min}^{-1}$	kg
570	0,36	1,9	2,8	730	1,8	1800	2400	10,2
310	0,26	2,6	3,8	415	2,5	2000	2600	5,56
385	0,22	3,1	4,6	530	3	1800	2400	8,56
570	0,38	1,8	2,7	740	1,7	1500	2000	11,9
340	0,27	2,5	3,7	455	2,4	2000	2600	6,49
455	0,33	2	3	660	2	1500	2000	8,65
425	0,22	3,1	4,7	580	3,1	1700	2200	9,99
730	0,37	1,8	2,7	960	1,7	1500	2000	15,2
410	0,3	2,3	3,3	640	2,2	1800	2400	7,75
540	0,28	2,4	3,5	700	2,3	1700	2200	9,18
570	0,33	2	3	840	2	1200	1600	12,2
510	0,21	3,2	4,8	690	3,2	1500	2000	13,9
870	0,37	1,8	2,7	1160	1,8	1400	1900	20,2
335	0,24	2,8	4,2	560	2,8	1800	2400	6,03
495	0,31	2,2	3,3	770	2,2	1700	2200	10,2
560	0,29	2,3	3,5	800	2,3	1700	2200	11,2
670	0,37	1,8	2,7	1020	1,8	1100	1500	15,0
930	0,36	1,8	2,7	1230	1,8	1100	1500	25,0
410	0,23	2,9	4,4	670	2,8	1700	2200	8,85
540	0,3	2,3	3,3	860	2,2	1500	2000	12,0
660	0,29	2,3	3,5	960	2,3	1700	2200	17,5
760	0,33	2	3	1170	2	1100	1500	18,4
1080	0,37	1,8	2,7	1450	1,8	1100	1400	32,9
435	0,22	3	4,6	750	2,8	1500	2000	9,16
600	0,3	2,3	3,3	990	2,2	1400	1800	14,5
670	0,29	2,3	3,5	990	2,3	1300	1700	18,1
880	0,37	1,8	2,7	1380	1,8	1000	1300	23,8
1240	0,38	1,7	2,6	1720	1,7	1000	1300	39,7
480	0,22	3	4,6	830	2,8	1400	1800	11,7
800	0,32	2,1	3,2	1320	2,1	1300	1700	21,5
810	0,29	2,3	3,5	1190	2,3	1200	1600	23,2
1030	0,38	1,8	2,7	1610	1,7	1000	1300	30,6

## Spherical Roller Bearings with withdrawal sleeve

SR 3918

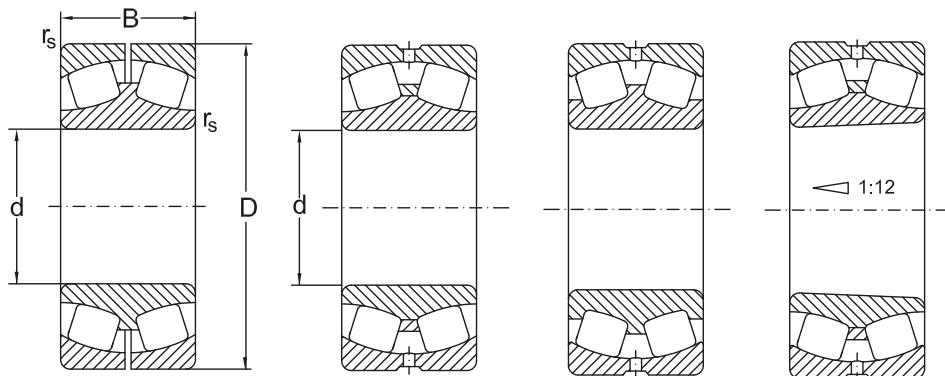


Dimensions								Designation	Withdrawal sleeve
$d_1$	$d$	$D$	$B$	$r_s$ min.	$d_2$	$B_1$	$B_2$	Bearing	
mm									
<b>135</b>	150	320	108	4	195	139	26	<b>22330 MBKW33</b>	<b>H2330</b>
<b>140</b>	160	240	60	2,1	190	93	28	<b>23032 MBKW33</b>	<b>H3032</b>
	160	270	86	2,1	210	119	28	<b>23132 MBKW33</b>	<b>H3132</b>
	160	290	104	3	210	147	28	<b>23232 MBKW33</b>	<b>H2332</b>
	160	290	80	3	210	119	28	<b>22232 MBKW33</b>	<b>H3132</b>
	160	340	114	4	210	147	28	<b>22332 MBKW33</b>	<b>H2332</b>
<b>150</b>	170	260	67	2,1	200	101	29	<b>23034 MBKW33</b>	<b>H3034</b>
	170	280	88	2,1	220	122	29	<b>23134 MBKW33</b>	<b>H3134</b>
	170	310	110	4	220	154	29	<b>23234 MBKW33</b>	<b>H2334</b>
	170	310	86	4	220	122	29	<b>22234 MBKW33</b>	<b>H3134</b>
	170	360	120	4	220	154	29	<b>22334 MBKW33</b>	<b>H2334</b>
<b>160</b>	180	280	74	2,1	210	109	30	<b>23036 MBKW33</b>	<b>H3036</b>
	180	300	96	3	230	131	30	<b>23136 MBKW33</b>	<b>H3138</b>
	180	320	112	4	230	161	30	<b>23236 MBKW33</b>	<b>H2336</b>
	180	320	86	4	230	131	30	<b>22236 MBKW33</b>	<b>H3136</b>
	180	380	126	4	230	161	30	<b>22336 MBKW33</b>	<b>H2336</b>
<b>170</b>	190	290	75	2,1	220	112	31	<b>23038 MBKW33</b>	<b>H3038</b>
	190	320	104	3	240	141	31	<b>23138 MBKW33</b>	<b>H3138</b>
	190	340	120	4	240	169	31	<b>23238 MBKW33</b>	<b>H2338</b>
	190	340	92	4	240	141	31	<b>22238 MBKW33</b>	<b>H3138</b>
	190	400	132	5	240	169	31	<b>22338 MBKW33</b>	<b>H2338</b>
<b>180</b>	200	310	82	2,1	240	120	32	<b>23040 CAKW33</b>	<b>H3040</b>
	200	340	112	3	250	150	32	<b>23140 CAKW33</b>	<b>H3140</b>
	200	360	128	4	250	176	32	<b>23240 MBKW33</b>	<b>H2340</b>
	200	360	98	4	250	150	32	<b>22240 CAKW33</b>	<b>H3140</b>
	200	420	138	5	250	176	32	<b>22340 CKW33</b>	<b>H2340</b>
<b>200</b>	220	340	90	3	260	126	30	<b>23044 MBKW33</b>	<b>H3044</b>
	220	340	90	3	260	126	30	<b>23044 MBKW33</b>	<b>H3044</b>
	220	370	120	4	280	161	35	<b>23144 MBKW33</b>	<b>H3144</b>
	220	400	108	4	280	161	35	<b>22244 MBKW33</b>	<b>H3144</b>
	220	400	144	4	280	186	35	<b>23244 MBKW33</b>	<b>H2344</b>

## Spherical Roller Bearings with withdrawal sleeve

Basic radial load. Factors				Speed limit				Mass
dyn. $C_r$	e	$Y_1$	$Y_2$	stat. $C_{0r}$	$Y_0$	grease	oil	
kN	-	-	-	kN	-	$\text{min}^{-1}$	$\text{min}^{-1}$	kg
1400	0,38	1,7	2,6	1940	1,7	1000	1300	49,7
560	0,22	3	4,6	970	2,8	1300	1700	14,7
930	0,32	2,1	3,2	1510	2,1	1200	1600	27,8
1180	0,38	1,8	2,7	1830	1,7	900	1200	40,2
950	0,29	2,3	3,4	1420	2,3	1100	1500	30,6
1520	0,37	1,8	2,7	2160	1,8	900	1200	59,1
680	0,23	2,9	4,4	1170	2,8	1200	1600	19,3
990	0,31	2,2	3,2	1650	2,1	1100	1500	30,4
1340	0,36	1,9	2,8	2120	1,8	850	1100	47,4
1080	0,3	2,3	3,4	1610	2,2	1100	1400	36,8
1690	0,37	1,8	2,7	2380	1,8	850	1100	70,4
800	0,24	2,8	4,2	1380	2,8	1100	1500	23,8
1160	0,32	2,1	3,1	1940	2,1	1100	1400	37,5
1420	0,36	1,9	2,8	2330	1,8	750	1000	51,4
1110	0,29	2,3	3,5	1720	2,3	1100	1400	38,9
1900	0,37	1,8	2,7	2700	1,8	850	1100	79,5
830	0,26	2,6	3,9	1470	2,6	1100	1400	25,5
1320	0,33	2	3	2290	2	1100	1400	45,8
1610	0,36	1,9	2,8	2640	1,8	750	1000	60,7
1220	0,29	2,3	3,4	1870	2,3	1000	1300	48,0
2060	0,37	1,8	2,7	2920	1,8	750	1000	95,6
880	0,24	2,8	4,2	1560	2,8	1100	1500	32,69
1370	0,35	1,9	2,9	2460	1,9	1100	1400	55,6
1620	0,35	1,9	2,9	2590	1,8	750	1000	72,4
1250	0,29	2,3	3,4	2020	2,3	1100	1400	57,1
1910	0,36	1,8	2,8	2750	1,8	670	900	108,9
1155	0,24	2,8	4,2	2053	2,8	1100	1400	40,8
1025	0,24	2,8	4,2	1730	2,8	1000	1300	41,8
1455	0,3	2,3	3,4	2380	2,2	900	1200	69,2
1485	0,29	2,3	3,4	2483	2,3	850	1100	77,7
1850	0,35	1,9	2,9	2899	1,8	600	800	99,2

## Spherical Roller Bearings Non-standardized



PMB

CW33

MBW33

CKW33

d	Dimensions			Basical radial load						Speed limit min <sup>-1</sup>	Designation	Mass
	D	B	$r_s$ min.	dyn. $C_r$	e	$\gamma_1$	$\gamma_2$	stat. $C_{0r}$	$\gamma_0$			
mm	kN						min <sup>-1</sup>					
100	162	62	3	312				479		1400	1700	25120 MB 5,44
130	220	73	2	500	0,31	2,2	3,3	995	2,2	1100	1400	25326 C 11,4
	240	80	3	572	0,33	2	3	1104	2	1100	1400	25126 MBK 15,3
131,796	220	73	2	470	0,31	2,2	3,3	1020	2,2	1100	1400	25226 C 11,2
	220	73	2	470	0,31	2,2	3,3	1020	2,2	1100	1400	25226 CW33 11,2
	220	73	2	470				1020		1100	1400	25226 CY 11,2
140	240	80	3	482	0,26	2,6	3,9	1030	2,5	950	1300	28228 PMB 19,9
	260	86	3	663	0,26	2,6	3,9	1288	2,5	950	1300	25128 MBK 19,9
144,475	250	80	2	625	0,33	2	3	1310	2	900	1200	25129 C 16,5
169	310	110	3	1228				1970		1200	1400	25134 C 36,3

## Spherical Roller Bearings Non-standardized

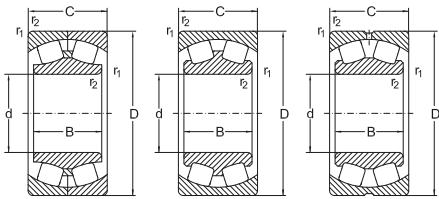


Fig. 4

Fig. 5

Fig. 6

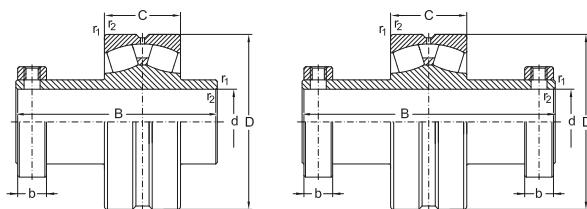


Fig. 7

Fig. 8

d	D	B	B <sub>1</sub>	Dimensions		Fig.	Basical radial load dyn. C <sub>a</sub>	Designation	Mass
				r <sub>s</sub> min.	r <sub>1s</sub> min.				
mm									
38,1	80	23	69,85	1,1	15,88	7	88	98	SB1000 1-1/2
42,877	85	23	73	1	15,9	7	131,5	188	SB1000 1-11/16
49,21	90	23	73	1,1	15,88	7	100	120	SB1000 1-15/16
61,93	120	31	85,75	1,5	22,3	7	158	195	SB1000 2-7/16
74,61	130	31	92,075	1,5	22,2	7	190	250	SB1000 2-15/16
87,31	160	40	102,4	2	22,23	7	305	410	SB1000 3-7/16
100,035	180	46	116	2,1	25,4	7	536	905	SB1000 3-15/16
112,71	200	53	155,58	2,1	25,4	8	590	770	SB1000 4-7/16 VSB
125,41	230	64	168,28	3	25,4	8	660	1700	SB1000 4-15/16 VSB
100	165	65	52	2		5	309	459	26120 MB
100	180	82	69	2,1		4	436	627	26220 CP
110	180	82	69	2		6	449	741	26122 CAW33
									7,53



# Thrust Ball Bearings

## Standards, Boundary dimensions

Standard plans	DIN 616
Thrust ball bearings single direction	DIN 711
Thrust ball bearings double direction	DIN 715
Seating washers	DIN 711

## General

**Thrust Ball Bearings** are separable axial bearings that are produced in both single and double direction acting design.

To assist in simple effective mounting or dismounting the bearing washers, seatings, and cage and ball assemblies, may be individually mounted in their arrangement location.

Thrust ball bearings may accommodate comparatively high axial loads but they must not be exposed to any radial forces.

Due to their specific kinematic behavior, thrust ball bearings are only suitable for low to medium operating speeds.

Furthermore, they require minimum axial loads for their optimum function.

Since thrust ball bearings do not compensate any misalignment, they are also frequently used in conjunction with spherel housing washers and seating washers.

## Design variants (see drawing on next page)

**Thrust ball bearings** are produced in both, single direction and double direction design. The most important design variants are shown on the next page.

**Single direction thrust ball bearings** consist of a **shaft washer**, a **housing washer** and a **ball and cage thrust assembly**, (see figure a, b and c).

These bearings are able to accommodate axial loads in one direction only.

**Single direction thrust ball bearings** of series **511, 512, 513** and **514** have plain housing washers, (see figure a).

For applications where some misalignment may occur, single direction thrust ball bearings of the series **532, 533** and **534** are also available with spherel housing washers, figure b.

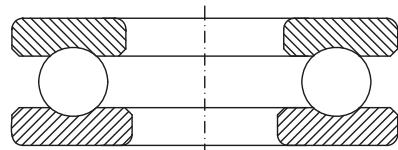
These bearings may be applied either direct to spherel shaped bearing seats or, they may be used together with **seating washers** of series **U2, U3** or **U4** (see figure c).

Unlike single direction thrust ball bearing types, **double direction thrust ball bearings** are suitable to guide the shaft in both directions (see figure d, e and f).

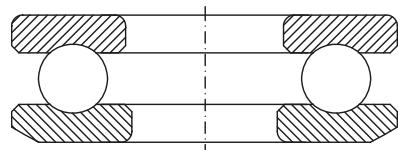
These bearings consist of two washers, **two ball and cage thrust assemblies** with one common **shaft washer** located centrally in between.

Double direction thrust ball bearings are also available in both designs, with **flat housing washers** (series **522, 523** and **524**, see figure d) and with **spherel housing washers** (series **542, 543** and **544**, see figure e).

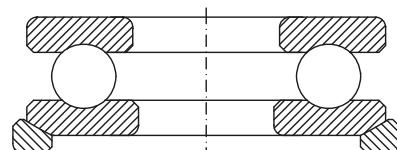
For compensation of possible aligning errors the double direction thrust ball bearings may be used in conjunction with Seating Washers (series U2, U3 and U4, see figure f).



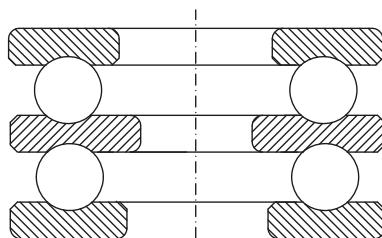
a



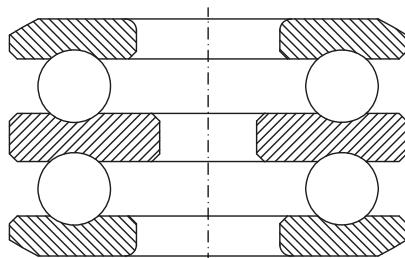
b



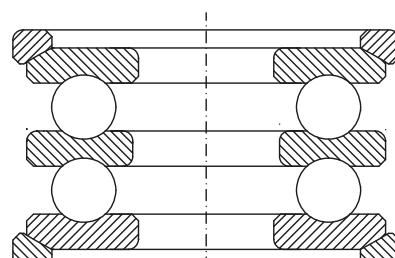
c



d



e



f

### **Misalignment**

**All thrust ball bearing types with flat housing washers do not allow any misalignment.**

The contacting surfaces of both shaft and housing seats must be parallel. Misalignments can only be accommodated by using Thrust Ball bearings with **sphered housing washers**.

### **Cages**

**URB** thrust ball bearings are normally fitted with pressed steel cages as standard.

For larger thrust ball bearings solid brass cages, (suffix **M**), or solid steel cages, suffix **F**, are fitted as standard.

### **Tolerances**

**URB** thrust ball bearings are produced to normal class tolerance class (**PN**) as standard.

For applications of higher dimensional and geometrical accuracy these bearings are produced to precision tolerance class (e.g. **P6**) on order request.

For detailed values of the tolerance classes see chapter **Bearing tolerances** (see page 41).

### **Minimum load:**

Thrust ball bearings require a certain minimum axial load to ensure a satisfactory operating function.

To prevent excessive sliding friction, the minimum axial load applied should be greater than **4%** of the axial bearing dynamic load rating **Ca**.

Where such a minimum axial load is not possible, the load must be increased by effective measures, (i.e. preloading the bearing) using pressure washers or springs.

### **Equivalent dynamic bearing load**

Thrust ball bearings are pure axial bearings, they are not able to accommodate any radial loads, therefore:

$$P=F_a$$

### **Equivalent static bearing load**

For thrust ball bearings:

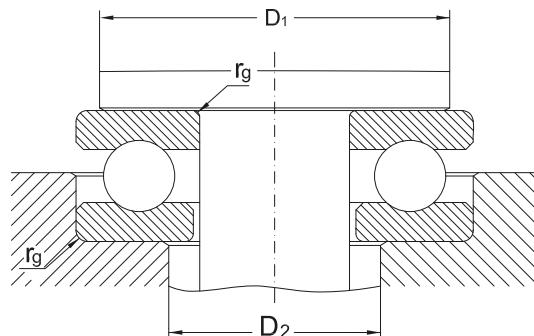
$$P_0=F_a$$

### **Abutment and Fillet dimensions for thrust ball bearings**

The bearing washer must contact adjacent parts with their face sides only. The radii of bearing corners must not touch the shoulder fillet radii of the shaft or housing shoulders.

Therefore, the largest fillet radius ( $r_g$ ) must be smaller than the minimum fillet dimension of the bearing rings ( $r_s$ ) as listed in the bearing tables.

## Abutment and Fillet dimensions for Thrust Ball bearings of series 511, 512, 513 and 514 [mm]

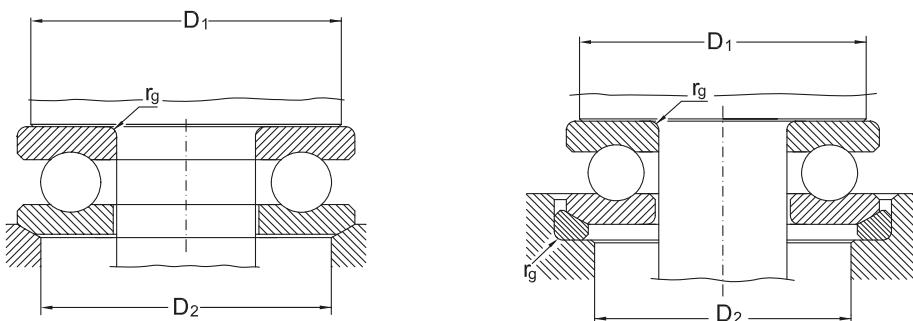


Shaft reference number $\Phi d_1$	Bearing Series											
	511			512			513			514		
	$D_1$ min	$D_2$ min	$r_g$ max	$D_1$ min	$D_2$ min	$r_g$ max	$D_1$ min	$D_2$ min	$r_g$ max	$D_1$ min	$D_2$ min	$r_g$ max
mm												
10 00	18	16	0,3	20	16	0,6	-	-	-	-	-	-
12 01	20	18	0,3	22	18	0,6	-	-	-	-	-	-
15 02	23	20	0,3	25	22	0,6	-	-	-	-	-	-
17 03	25	22	0,3	28	24	0,6	-	-	-	-	-	-
20 04	29	26	0,3	32	28	0,6	-	-	-	-	-	-
25 05	35	32	0,6	38	34	0,6	41	36	1	46	39	1
30 06	40	37	0,6	43	39	0,6	48	42	1	54	46	1
35 07	45	42	0,6	51	46	1	55	48	1	62	53	1
40 08	52	48	0,6	57	51	1	63	55	1	70	60	1
45 09	57	53	0,6	62	56	1	69	61	1	78	67	1
50 10	62	58	0,6	67	61	1	77	68	1	86	74	1,5
55 11	69	64	0,6	76	69	1	85	75	1	94	81	1,5
60 12	75	70	1	81	74	1	90	80	1	102	88	1,5
65 13	80	75	1	86	79	1	95	85	1	110	95	2
70 14	85	80	1	91	84	1	103	92	1	118	102	2
75 15	90	85	1	96	89	1	111	99	1,5	126	109	2
80 16	95	90	1	101	94	1	116	104	1,5	134	116	2,1
85 17	100	95	1	109	101	1	124	111	1,5	142	123	2,1
90 18	108	102	1	117	108	1	129	116	1,5	150	130	2,1
100 20	121	114	1	130	120	1	142	128	1,5	166	144	2,5
110 22	131	124	1	140	130	1	158	142	2	182	158	2,5
120 24	141	134	1	150	140	1	174	156	2,1	198	172	3
130 26	154	146	1	166	154	1	187	168	2,1	214	186	3
140 28	164	156	1	176	164	1	200	180	2,1	224	196	3
150 30	174	166	1	189	176	1	210	190	2,1	240	210	3

**Abutment and Fillet dimensions for Thrust Ball bearings  
of series 511, 512 and 513 [mm]**

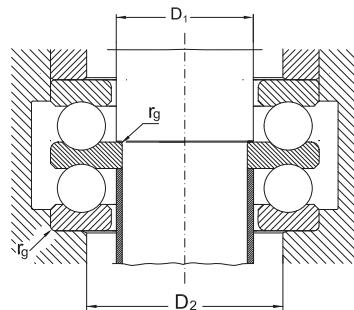
Shaft reference number	$\Phi d_1$	Bearing Series								
		511			512			513		
		$D_1$ min	$D_2$ min	$r_g$ max	$D_1$ min	$D_2$ min	$r_g$ max	$D_1$ min	$D_2$ min	$r_g$ max
mm										
160	32	184	176	1	199	186	1,5	226	204	2,5
170	34	197	188	1	212	198	1,5	236	214	2,5
180	36	207	198	1	222	208	1,5	252	228	2,5
190	38	220	210	1	238	222	2	268	242	3
200	40	230	220	1	248	232	2	284	256	3
220	44	250	240	1	268	252	2	-	-	-
240	48	276	264	1,5	300	280	2,1	-	-	-
260	52	296	284	1,5	320	300	2,1	-	-	-
280	56	322	308	1,5	340	320	2,1	-	-	-
300	60	348	332	2	372	348	2,5	-	-	-
320	64	368	352	2	392	368	2,5	-	-	-
340	68	388	372	2	412	388	2,5	-	-	-
360	72	408	392	2	444	416	3	-	-	-
380	76	428	412	2	-	-	-	-	-	-
400	80	448	432	2	-	-	-	-	-	-
420	84	468	452	2	-	-	-	-	-	-
440	88	500	480	2,1	-	-	-	-	-	-
460	92	520	500	2,1	-	-	-	-	-	-
480	96	540	520	2,1	-	-	-	-	-	-
500	/500	560	540	2,1	-	-	-	-	-	-
530	/530	596	574	2,5	-	-	-	-	-	-
560	/560	626	604	2,5	-	-	-	-	-	-

## Abutment and Fillet dimensions for Thrust Ball bearings of series 532, 533, and 534 [mm]



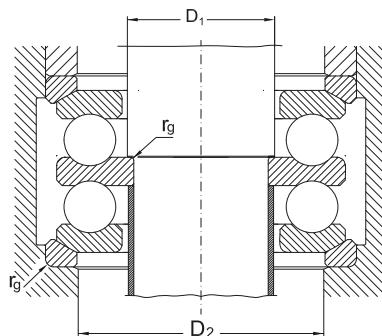
Shaft reference number	<b>532</b>	<b>Bearing Series</b>			<b>534</b>	
		D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max		
<b>mm</b>						
<b>10 00</b>	20	18	0,6	-	-	-
<b>12 01</b>	22	20	0,6	-	-	-
<b>15 02</b>	25	24	0,6	-	-	-
<b>17 03</b>	28	26	0,6	-	-	-
<b>20 04</b>	32	30	0,6	-	-	-
<b>25 05</b>	38	36	0,6	41	38	1
<b>30 06</b>	43	42	0,6	48	45	1
<b>35 07</b>	51	48	1	55	52	1
<b>40 08</b>	57	55	1	63	60	1
<b>45 09</b>	62	60	1	69	65	1
<b>50 10</b>	67	62	1	77	72	1
<b>55 11</b>	76	72	1	85	80	1
<b>60 12</b>	81	78	1	90	85	1
<b>65 13</b>	86	82	1	95	90	1
<b>70 14</b>	91	88	1	103	98	1
<b>75 15</b>	96	92	1	111	105	1,5
<b>80 16</b>	101	98	1	116	110	1,5
<b>85 17</b>	109	105	1	124	115	1,5
<b>90 18</b>	117	110	1	129	120	1,5
<b>100 20</b>	130	125	1	142	135	1,5
<b>110 22</b>	140	135	1	158	150	2
<b>120 24</b>	150	145	1	174	165	2
<b>130 26</b>	166	160	1,5	187	177	2,1
<b>140 28</b>	176	170	1,5	200	190	2,1
<b>150 30</b>	189	180	1,5	210	200	2,1
<b>160 32</b>	199	190	1,5	-	-	-
<b>170 34</b>	212	200	1,5	-	-	-
<b>180 36</b>	222	210	1,5	-	-	-
<b>190 38</b>	238	230	1,5	-	-	-

**Abutment and Fillet dimensions for Thrust Ball bearings  
of series 522, 523 and 524 [mm]**



Shaft Bore reference number	<b>522</b>	Bearing Series								<b>524</b>				
		D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	r <sub>g1</sub> max	D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	r <sub>g1</sub> max		D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	r <sub>g1</sub> max
mm														
<b>10 02</b>	15	22	0,6	0,3	-	-	-	-	-	<b>15</b>	25	39	1	0,6
<b>15 04</b>	20	28	0,6	0,3	-	-	-	-	-	<b>20</b>	30	46	1	0,6
<b>20 05</b>	25	34	0,6	0,3	25	36	1	0,3	<b>25</b>	35	53	1	0,6	
<b>25 06</b>	30	39	0,6	0,3	30	42	1	0,3	<b>30</b>	40	60	1	0,6	
<b>30 07</b>	35	46	1	0,3	35	48	1	0,3	<b>35</b>	45	67	1	0,6	
<b>30 08</b>	40	51	1	0,6	40	55	1	0,6	<b>40</b>	50	74	1,5	0,6	
<b>35 09</b>	45	56	1	0,6	45	61	1	0,6	<b>45</b>	55	81	1,5	0,6	
<b>40 10</b>	50	61	1	0,6	50	68	1	0,6	<b>50</b>	60	88	1,5	0,6	
<b>45 11</b>	55	69	1	0,6	55	75	1	0,6	<b>55</b>	70	102	2	1	
<b>50 12</b>	60	74	1	0,6	60	80	1	0,6	<b>60</b>	75	109	2	1	
<b>55 13</b>	65	79	1	0,6	65	85	1	0,6	<b>65</b>	80	116	2,1	1	
<b>55 14</b>	70	84	1	1	70	92	1	1	<b>70</b>	85	123	2,1	1	
<b>60 15</b>	75	89	1	1	75	99	1,5	1	<b>75</b>	90	130	2,1	1	
<b>65 16</b>	80	94	1	1	80	104	1,5	1	<b>80</b>	100	144	2,5	1	
<b>70 17</b>	85	101	1	1	85	111	1,5	1	<b>85</b>	110	154	2,1	1	
<b>75 18</b>	90	108	1	1	90	116	1,5	1	<b>90</b>	120	168	2,1	1	
<b>85 20</b>	100	120	1	1	100	128	1,5	1	<b>100</b>	130	186	1,5	1	
<b>95 22</b>	110	130	1	1	110	142	2	1	<b>110</b>	140	190	2,1	1	
<b>100 24</b>	120	140	1	1	120	156	2,1	1	<b>120</b>	150	204	2,1	1	
<b>110 26</b>	130	154	1,5	1	130	168	2,1	1	<b>130</b>	160	220	2,1	1	
<b>120 28</b>	140	164	1,5	1	140	180	2,1	1	<b>140</b>	170	236	1,5	1	
<b>130 30</b>	150	176	1,5	1	150	190	2,1	1	<b>150</b>	180	254	1,5	1	
<b>140 32</b>	160	186	1,5	1	-	-	-	-	<b>160</b>	190	274	1,5	1	
<b>150 34</b>	170	198	1,5	1	-	-	-	-	<b>170</b>	200	294	1,5	1	

## Abutment and Fillet dimensions for Thrust Ball bearings of series 542, 543 and 544 [mm]



Shaft reference number	$\Phi d_1$	Bearing Series												
		542				543				544				
		D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	r <sub>g1</sub> max	D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	r <sub>g1</sub> max	Shaft	D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	r <sub>g1</sub> max
mm														
10 02		15	24	0,6	0,3	-	-	-	-	-	-	-	-	
15 04		20	30	0,6	0,3	-	-	-	-	-	-	-	-	
20 05		25	36	0,6	0,3	25	38	1	0,3	15	25	42	1	0,6
25 06		30	42	0,6	0,3	30	45	1	0,3	20	30	50	1	0,6
30 07		35	48	1	0,3	35	52	1	0,3	25	35	58	1	0,6
30 08		40	55	1	0,6	40	60	1	0,6	30	40	65	1	0,6
35 09		45	60	1	0,6	45	65	1	0,6	35	45	72	1	0,6
40 10		50	62	1	0,6	50	72	1	0,6	40	50	80	1,5	0,6
45 11		55	72	1	0,6	55	80	1	0,6	45	55	88	1,5	0,6
50 12		60	78	1	0,6	60	85	1	0,6	50	60	95	1,5	0,6
55 13		65	82	1	0,6	65	90	1	0,6	50	65	100	2	1
55 14		70	88	1	1	70	98	1	1	55	70	110	2	1
60 15		75	92	1	1	75	105	1,5	1	60	75	115	2	1
65 16		80	98	1	1	80	110	1,5	1	65	80	125	2,1	1
70 17		85	105	1	1	85	115	1,5	1	65	85	130	2,1	1
75 18		90	110	1	1	90	120	1,5	1	70	90	140	2,1	1
85 20		100	125	1	1	100	135	1,5	1	80	100	155	2,5	1
95 22		110	135	1	1	110	150	2	1	-	-	-	-	-
100 24		120	145	1	1	120	165	2,1	1	-	-	-	-	-
110 26		130	160	1,5	1	-	-	-	-	-	-	-	-	-

**URB GROUP**

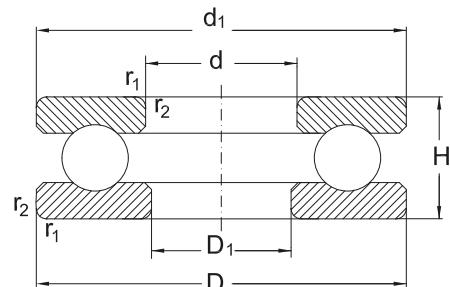
URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

508

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

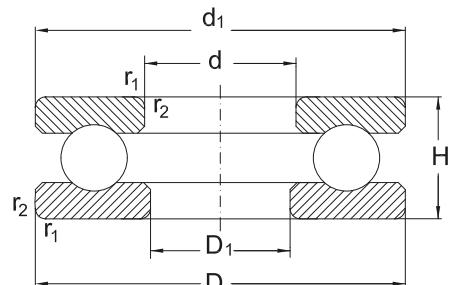
Shaft Dimension				Designation	Basical axial load dyn. C <sub>a</sub>	axial load stat. C <sub>0a</sub>	Speed limit grease	Speed limit oil
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.		kN		min <sup>-1</sup>	
mm								
<b>10</b>	24	9	0,3	<b>51100</b>	10	14	7000	9500
	26	11	0,6	<b>51200</b>	12,7	17,1	6000	8000
<b>12</b>	26	9	0,3	<b>51101</b>	10,4	15,4	6700	9000
	28	11	0,6	<b>51201</b>	13,2	19	6000	8000
<b>15</b>	28	9	0,3	<b>51102</b>	10,5	16,8	6300	8500
	32	11	0,6	<b>51202</b>	16,6	25	5000	6700
<b>17</b>	30	9	0,3	<b>51103</b>	10,8	18,2	6300	8500
	35	12	0,6	<b>51203</b>	17,3	27,5	5000	6700
<b>20</b>	35	10	0,3	<b>51104</b>	14,9	26,6	5300	7000
	40	14	0,6	<b>51204</b>	22,4	37,7	4300	5600
<b>25</b>	42	11	0,6	<b>51105</b>	15,6	30,4	4800	6300
	47	15	0,6	<b>51205</b>	28	50,5	3800	5000
	52	18	1	<b>51305</b>	35,4	61,5	3150	4200
	60	24	1	<b>51405</b>	56	90	2600	3600
<b>30</b>	47	11	0,6	<b>51106</b>	18,6	39,9	4300	5600
	52	16	0,6	<b>51206</b>	28,1	54,3	3600	4800
	60	21	1	<b>51306</b>	42,2	78,7	2900	3900
	70	28	1	<b>51406</b>	72	125	2200	3200
<b>35</b>	52	12	0,6	<b>51107</b>	19,1	44,4	4000	5300

## Thrust Ball bearings, single direction

Abutment and fillet  
dimensions see on  
page 503

Shaft d	Dimensions		Mass Bearing [kg]
	d <sub>1</sub>	D <sub>1</sub>	
<b>mm</b>			
<b>10</b>	24	11	0,02
	26	12	0,03
<b>12</b>	26	13	0,02
	28	14	0,03
<b>15</b>	28	16	0,02
	32	17	0,05
<b>17</b>	30	18	0,03
	35	19	0,05
<b>20</b>	35	21	0,04
	40	22	0,08
<b>25</b>	42	26	0,06
	47	27	0,12
	52	27	0,17
	60	27	0,36
<b>30</b>	47	32	0,07
	52	32	0,13
	60	32	0,26
	70	32	0,58
<b>35</b>	52	37	0,09

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

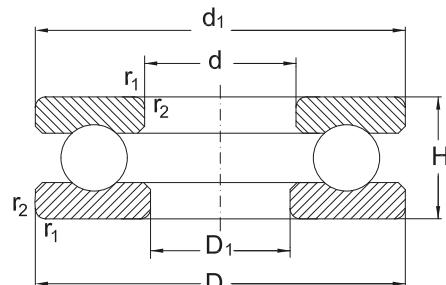
Shaft		Dimension		Designation	Basical dyn. $C_a$	axial load stat. $C_{0a}$	Speed limit grease	Speed limit oil
d	D	H	$r_1, r_2$ min.		kN		min <sup>-1</sup>	
mm								
<b>35</b>	62	18	1	<b>51207</b>	38,8	78,2	3000	4000
	68	24	1	<b>51307</b>	55,4	105	2600	3600
	80	32	1,1	<b>51407</b>	86,5	156	2000	3000
<b>40</b>	60	13	0,6	<b>51108</b>	26,8	62,9	3400	4500
	68	19	1	<b>51208</b>	46,9	98,3	2800	3800
	78	26	1	<b>51308</b>	68,4	135	2200	3200
	90	36	1,1	<b>51408</b>	112	204	1700	2400
<b>45</b>	65	14	0,6	<b>51109</b>	27,2	69,2	3400	4500
	73	20	1	<b>51209</b>	49,3	112	2600	3600
	85	28	1	<b>51309</b>	78,9	164	2000	3000
	100	39	1,1	<b>51409</b>	140	262	1600	2200
<b>50</b>	70	14	0,6	<b>51110</b>	28,1	75,5	3200	4300
	78	22	1	<b>51210</b>	56,3	129	2400	3400
	95	31	1,1	<b>51310</b>	95,3	202	1900	2800
	110	43	1,5	<b>51410</b>	156	310	1500	2000
<b>55</b>	78	16	0,6	<b>51111</b>	31,1	81,5	2800	3800
	90	25	1	<b>51211</b>	68,8	159	2200	3200
	105	35	1,1	<b>51311</b>	118	246	1700	2400
	120	48	1,5	<b>51411</b>	180	360	1300	1800

## Thrust Ball bearings, single direction

Abutment and fillet  
dimensions see on  
page 503

Shaft	Dimensions		Mass Bearing
	d	d <sub>1</sub>	
mm			[kg]
<b>35</b>	62	37	0,22
	68	37	0,38
	80	37	0,96
<b>40</b>	60	42	0,13
	68	42	0,28
	78	42	0,53
	90	42	1,17
<b>45</b>	65	47	0,15
	73	47	0,30
	85	47	0,61
	100	47	1,60
<b>50</b>	70	52	0,17
	78	52	0,37
	95	52	0,94
	110	52	2,18
<b>55</b>	78	57	0,25
	90	57	0,59
	105	57	1,30
	120	57	2,91

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

Shaft			Dimension		Designation	Basical axial load	Speed limit		
d	D	H	$r_1, r_2$ min.		dyn. $C_a$	stat. $C_{0a}$	grease	oil	
mm					kN		$\text{min}^{-1}$		
<b>60</b>	85	17	1		<b>51112</b>	37,9	98,6	2600	3600
	95	26	1		<b>51212</b>	70,4	169	2000	3000
	110	35	1,1		<b>51312</b>	123	267	1600	2200
	130	51	1,5		<b>51412 FP</b>	200	400	1200	1700
<b>65</b>	90	18	1		<b>51113</b>	39,2	108	2400	3400
	100	27	1		<b>51213</b>	78,5	191	2000	3000
	115	36	1,1		<b>51313</b>	127	287	1600	2200
	140	56	2		<b>51413 FP</b>	216	450	1100	1600
<b>70</b>	95	18	1		<b>51114</b>	39,3	113	2400	3400
	105	27	1		<b>51214</b>	72,8	189	1900	2800
	125	40	1,1		<b>51314</b>	153	341	1400	1900
	150	60	2		<b>51414 FP</b>	236	500	1100	1600
<b>75</b>	100	19	1		<b>51115</b>	47,2	140	2200	3200
	110	27	1		<b>51215</b>	73,7	199	1900	2800
	135	44	1,5		<b>51315</b>	184	426	1300	1800
	160	65	2		<b>51415 FP</b>	250	560	1000	1500
<b>80</b>	105	19	1		<b>51116</b>	48,5	145	2200	3200
	115	28	1		<b>51216</b>	76,1	209	1800	2600
	140	44	1,5		<b>51316</b>	181	426	1300	1800
	170	68	2,1		<b>51416 FP</b>	270	620	950	1400

513

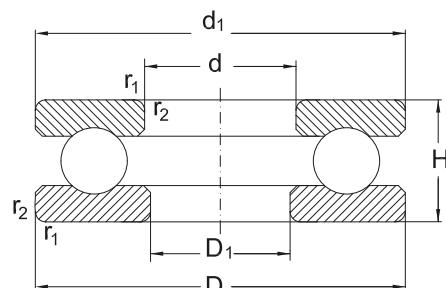
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## Thrust Ball bearings, single direction

*Abutment and fillet dimensions see on page 503*

Shaft d	Dimensions		Mass Bearing [kg]
	d <sub>1</sub>	D <sub>1</sub>	
<i>mm</i>			
<b>60</b>	85	62	0,33
	95	62	0,65
	110	62	1,37
	130	62	3,70
<b>65</b>	90	67	0,36
	100	67	0,74
	115	67	1,49
	140	68	4,67
<b>70</b>	95	72	0,39
	105	72	0,78
	125	72	1,91
	150	73	5,72
<b>75</b>	100	77	0,52
	110	77	0,83
	135	77	2,61
	160	78	7,06
<b>80</b>	105	82	0,56
	115	82	0,91
	140	82	2,71
	170	83	8,23

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

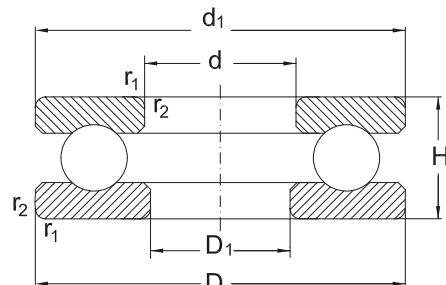
Shaft Dimension			Designation		Basical axial load		Speed limit	
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.		dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	grease	oil
mm								
<b>85</b>	110	19	1	<b>51117</b>	48	151	2200	3200
	125	31	1	<b>51217</b>	98	264	1600	2200
	150	49	1,5	<b>51317</b>	290	716	1200	1700
	180	72	2,1	<b>51417 FP</b>	290	680	900	1300
<b>90</b>	120	22	1	<b>51118</b>	62,3	190	1900	2800
	135	35	1,1	<b>51218</b>	127	338	1500	2000
	155	50	1,5	<b>51318</b>	196	465	1200	1700
	190	77	2,1	<b>51418 FP</b>	305	750	850	1200
<b>100</b>	135	25	1	<b>51120</b>	85	270	1600	2200
	150	38	1,1	<b>51220</b>	149	402	1400	1900
	170	55	1,5	<b>51320</b>	247	628	1100	1600
	210	85	3	<b>51420 FP</b>	365	965	750	1000
<b>110</b>	145	25	1	<b>51122</b>	86,5	290	1600	2200
	160	38	1,1	<b>51222</b>	156	447	1300	1800
	190	63	2	<b>51322</b>	319	869	950	1400
	230	95	3	<b>51422 FP</b>	415	1140	700	950
<b>120</b>	155	25	1	<b>51124</b>	90	310	1500	2000
	170	39	1,1	<b>51224</b>	170	509	1200	1700
	210	70	2,1	<b>51324</b>	325	915	850	1200
	250	102	4	<b>51424 FP</b>	425	1220	670	900

## Thrust Ball bearings, single direction

*Abutment and fillet dimensions see on page 503*

Shaft d	Dimensions		Mass Bearing [kg]
	d <sub>1</sub>	D <sub>1</sub>	
<b>mm</b>			
<b>85</b>	110	87	0,60
	125	88	1,22
	150	88	3,53
	177	88	9,79
<b>90</b>	120	92	0,88
	135	93	1,68
	155	93	3,57
	187	93	11,60
<b>100</b>	135	102	1,30
	150	103	2,22
	170	103	4,95
	205	103	15,40
<b>110</b>	145	112	1,45
	160	113	2,41
	187	113	7,70
	225	113	20,80
<b>120</b>	155	122	1,59
	170	123	2,67
	205	123	10,70
	245	123	26,50

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

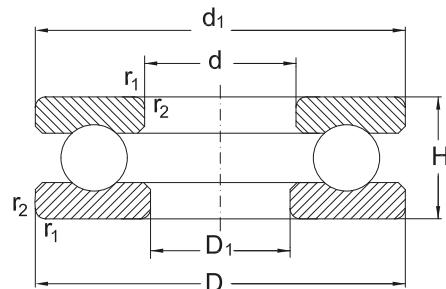
Shaft Dimension				Designation	Basical axial load	Speed limit	
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.		dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	grease      oil
mm				kN		$\text{min}^{-1}$	
<b>130</b>	170	30	1	<b>51126</b>	117	392	1300 1800
	190	45	1,5	<b>51226</b>	183	540	1100 1600
	225	75	2,1	<b>51326 MP</b>	360	1060	800 1100
	270	110	4	<b>51426 FP</b>	520	1600	600 800
<b>140</b>	180	31	1	<b>51128</b>	112	400	1300 1800
	200	46	1,5	<b>51228</b>	190	570	1000 1500
	240	80	2,1	<b>51328 MP</b>	400	1220	750 1000
<b>150</b>	190	31	1	<b>51130 FP</b>	110	400	1200 1700
	215	50	1,5	<b>51230 MP</b>	236	735	950 1400
	250	80	2,1	<b>51330 MP</b>	405	1290	700 950
	300	120	4	<b>51430 FP</b>	560	1800	560 750
<b>160</b>	200	31	1	<b>51132 FP</b>	112	430	1200 1700
	225	51	1,5	<b>51232 MP</b>	245	780	950 1400
	270	87	3	<b>51332 M</b>	479	1582	670 900
<b>170</b>	215	34	1,1	<b>51134 FP</b>	132	500	1100 1600
	240	55	1,5	<b>51234 MP</b>	285	930	850 1200
	280	87	3	<b>51334 M</b>	496	1704	670 900
<b>180</b>	225	34	1,1	<b>51136 FP</b>	134	530	1000 1500
	250	56	1,5	<b>51236 MP</b>	290	1000	850 1200
	300	95	3	<b>51336 M</b>	546	1956	600 800

## Thrust Ball bearings, single direction

*Abutment and fillet dimensions see on page 503*

Shaft d	Dimensions		Mass Bearing [kg]
	d <sub>1</sub>	D <sub>1</sub>	
<b>mm</b>			
<b>130</b>	170	132	2,37
	187	133	3,99
	220	134	13,00
	265	134	32,80
<b>140</b>	178	142	2,59
	197	143	4,33
	235	144	15,70
<b>150</b>	188	152	2,26
	212	153	6,09
	245	154	16,40
	295	154	43,10
<b>160</b>	198	162	2,39
	222	163	6,56
	265	164	21,30
<b>170</b>	213	172	3,08
	237	173	8,12
	275	174	22,50
<b>180</b>	222	183	3,17
	245	183	8,70
	295	184	28,3

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

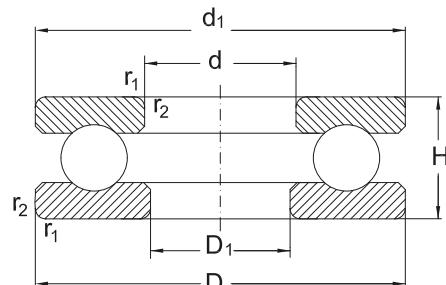
Shaft Dimension				Designation	Basical axial load	Speed limit		
d	D	H	$r_1, r_2$ min.		dyn. $C_a$	stat. $C_{0a}$	grease	oil
mm						kN		$\text{min}^{-1}$
<b>190</b>	240	37	1,1	<b>51138 FP</b>	170	655	950	1400
	270	62	2	<b>51238 MP</b>	335	1160	750	1000
	320	105	4	<b>51338 M</b>	600	2200	560	750
<b>200</b>	250	37	1,1	<b>51140 FP</b>	170	655	950	1400
	280	62	2	<b>51240 MP</b>	340	1220	750	1000
	340	110	4	<b>51340 M</b>	656	2414	530	700
<b>220</b>	270	37	1,1	<b>51144 FP</b>	176	735	850	1200
	300	63	2	<b>51244 MP</b>	355	1340	700	950
<b>240</b>	300	45	1,5	<b>51148 FP</b>	232	965	750	1000
	340	78	2,1	<b>51248 MP</b>	465	1860	600	800
<b>260</b>	320	45	1,5	<b>51152 FP</b>	236	1020	750	1000
	360	79	2,1	<b>51252 MP</b>	475	2000	560	750
<b>280</b>	350	53	1,5	<b>51156 FP</b>	315	1340	670	900
	380	80	2,1	<b>51256 MP</b>	490	2160	560	750
<b>300</b>	380	62	2	<b>51160 FP</b>	365	1600	600	800
	420	95	3	<b>51260 MP</b>	610	2750	480	630
<b>320</b>	400	63	2	<b>51164 FP</b>	375	1700	560	750
	440	95	3	<b>51264 MP</b>	620	2900	480	630
<b>340</b>	420	64	2	<b>51168 FP</b>	380	1800	560	750
	460	96	3	<b>51268 M</b>	640	3150	450	600

## Thrust Ball bearings, single direction

*Abutment and fillet dimensions see on page 503*

Shaft d	Dimensions		Mass Bearing [kg]
	d <sub>1</sub>	D <sub>1</sub>	
<b>mm</b>			
<b>190</b>	237	193	4,08
	265	194	11,70
	315	195	35,70
<b>200</b>	245	203	4,26
	275	204	12,00
	335	205	44,30
<b>220</b>	265	223	4,64
	295	224	13,20
<b>240</b>	297	243	7,69
	335	244	23,00
<b>260</b>	317	263	8,25
	355	264	25,20
<b>280</b>	347	283	12,50
	375	284	26,70
<b>300</b>	376	304	17,70
	415	304	42,30
<b>320</b>	396	324	19,10
	435	325	44,20
<b>340</b>	416	344	20,50
	455	345	47,00

## Thrust Ball bearings, single direction



511/ 512/ 513/ 514

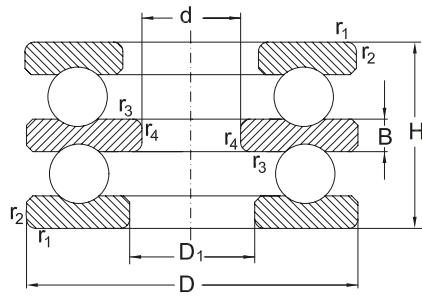
Shaft Dimension				Designation	Basical axial load	Speed limit		
d	D	H	$r_1, r_2$ min.		dyn. $C_a$	stat. $C_{0a}$	grease	oil
mm						kN		$\text{min}^{-1}$
<b>360</b>	440	65	2	<b>51172 MP</b>	405	2000	530	700
	500	110	4	<b>51272 M</b>	765	3900	400	530
<b>380</b>	460	65	2	<b>51176 MP</b>	430	2240	500	670
<b>400</b>	480	65	2	<b>51180 MP</b>	440	2320	500	670
<b>420</b>	500	65	2	<b>51184 MP</b>	440	2450	480	630
<b>460</b>	560	80	2,1	<b>51192 MP</b>	530	3100	430	560
<b>500</b>	600	80	2,1	<b>511/500 MP</b>	550	3350	400	530
<b>530</b>	640	85	3	<b>511/530 MP</b>	620	3900	360	480
<b>560</b>	670	85	3	<b>511/560 MP</b>	630	4150	300	380

## Thrust Ball bearings, single direction

*Abutment and fillet dimensions see on page 503*

Shaft	Dimensions		Mass
d	d <sub>1</sub>	D <sub>1</sub>	Bearing
mm			[kg]
<b>360</b>	436	364	21,50
	495	365	69,50
<b>380</b>	456	384	22,40
<b>400</b>	476	404	23,50
<b>420</b>	495	424	24,40
<b>460</b>	555	464	42,00
<b>500</b>	595	505	44,90
<b>530</b>	635	535	54,80
<b>560</b>	665	565	58,00

## Thrust Ball bearings, double direction



522/ 523/ 524

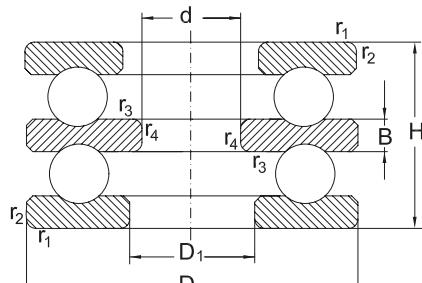
Shaft			Dimension		Designation	Basical axial load		Speed limit	
d	D	H	$r_1, r_2$ min.	$r_3, r_4$ min.		dyn. $C_a$	stat. $C_{0a}$	grease	oil
mm							kN	$\text{min}^{-1}$	
<b>10</b>	32	22	0,6	0,3	<b>52202</b>	16,6	25	5000	6700
<b>15</b>	40	26	0,6	0,3	<b>52204</b>	22,4	37,7	4300	5600
	60	45	1	0,6	<b>52205</b>	56	90	2600	3600
<b>20</b>	47	28	0,6	0,3	<b>52205</b>	28	50,4	3800	5000
	52	34	1	0,3	<b>52305</b>	35,7	61,4	3200	4300
	70	52	1	0,6	<b>52406</b>	72	125	2200	3200
<b>25</b>	52	29	0,6	0,3	<b>52206</b>	28,1	54,3	3600	4800
	60	38	1	0,3	<b>52306</b>	42,8	78,7	3000	4000
	80	59	1,1	0,6	<b>52407</b>	86,5	156	2000	3000
<b>30</b>	62	34	1	0,3	<b>52207</b>	40,7	83,8	3000	4000
	68	36	1	0,6	<b>52208</b>	46,9	98,3	2800	3800
	68	44	1	0,3	<b>52307</b>	55,5	105	2600	3600
	78	49	1	0,6	<b>52308</b>	69,3	135	2200	3200
	90	65	1,1	0,6	<b>52408</b>	112	204	1700	2400
<b>35</b>	73	37	1	0,6	<b>52209</b>	47,7	105	2600	3600
	85	52	1	0,6	<b>52309</b>	80,8	163	2000	3000
	100	72	1,1	0,6	<b>52409</b>	129	245	1600	2200
<b>40</b>	78	39	1	0,6	<b>52210</b>	50	111	2400	3400
	95	58	1,1	0,6	<b>52310</b>	91,6	186	1900	2800
	110	78	1,5	0,6	<b>52410</b>	156	310	1500	200

## Thrust Ball bearings, double direction

Abutment and fillet  
dimensions see on  
page 506

Shaft d	Dimensions		Mass Bearing [kg]
	D <sub>1</sub>	B	
10	17	5	0,08
15	22	6	0,15
	27	11	0,59
20	27	7	0,22
	27	8	0,32
	32	12	0,92
25	32	7	0,25
	32	9	0,47
	37	14	1,35
30	37	8	0,41
	42	9	0,55
	37	10	0,68
	42	12	1,01
	42	15	1,92
35	47	9	0,60
	47	12	1,25
	47	17	2,55
40	52	9	0,71
	52	14	1,77
	52	18	3,43

## Thrust Ball bearings, double direction



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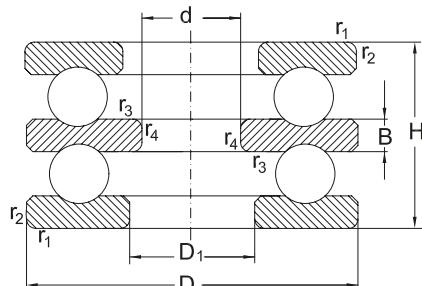
Shaft		Dimension		Designation		Basical	axial load	Speed limit
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.		dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	grease      oil
mm				kN		min <sup>-1</sup>		
<b>45</b>	90	45	1	0,6	<b>52211</b>	69,4	159	2200 3200
	105	64	1,1	0,6	<b>52311</b>	119	246	1700 2400
	120	87	1,5	0,6	<b>52411</b>	180	360	1300 1800
<b>50</b>	95	46	1	0,6	<b>52212</b>	73,6	179	2000 3000
	110	64	1,1	0,6	<b>52312</b>	124	267	1600 2200
	130	93	1,5	0,6	<b>52412</b>	200	400	1200 1700
	140	101	2	1	<b>52413</b>	216	450	1100 1600
<b>55</b>	100	47	1	0,6	<b>52213</b>	74,8	189	2000 3000
	105	47	1	1	<b>52214</b>	73,6	189	1900 2800
	115	65	1,1	0,6	<b>52313</b>	106	220	1600 2200
	125	72	1,1	1	<b>52314</b>	148	339	1400 1900
	150	107	2	1	<b>52414</b>	236	500	1100 1600
<b>60</b>	110	47	1	1	<b>52215</b>	77,4	209	1900 2800
	135	79	1,5	1	<b>52315</b>	171	396	1300 1800
	160	115	2	1	<b>52415</b>	250	560	1000 1500
<b>65</b>	115	48	1	1	<b>52216</b>	78,5	218	1800 2600
	140	79	1,5	1	<b>52316</b>	176	424	1300 1800
	170	120	2	1	<b>52416</b>	270	620	950 1400
	180	128	2,1	1,1	<b>52417</b>	290	680	900 1300
<b>70</b>	125	55	1	1	<b>52217</b>	92,3	251	1600 2200

## Thrust Ball bearings, double direction

Abutment and fillet  
dimensions see on  
page 506

Shaft	Dimensions		Mass Bearing
	d	D <sub>1</sub>	
mm		B	[kg]
<b>45</b>	57	10	1,10
	57	15	2,38
	57	20	4,52
<b>50</b>	62	10	1,21
	62	15	2,53
	62	21	5,72
	68	23	7,18
<b>55</b>	67	10	1,34
	72	10	1,47
	67	15	2,73
	72	16	3,66
	73	24	8,76
<b>60</b>	77	10	1,57
	77	18	4,80
	78	26	10,80
<b>65</b>	82	10	1,72
	82	18	4,94
	83	27	12,70
	88	29	15,10
<b>70</b>	88	12	2,39

## Thrust Ball bearings, double direction



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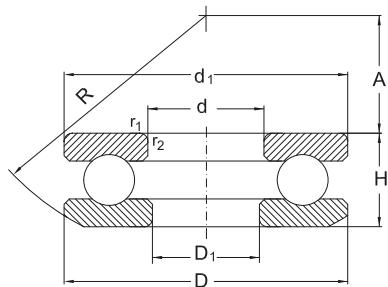
Shaft			Dimension		Designation	Basical axial load		Speed limit	
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.		dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	grease	oil
mm									
<b>70</b>	150	87	1,5	1	<b>52317</b>	190	425	1200	1700
	190	135	2,1	1,1	<b>52418</b>	305	750	850	1200
<b>75</b>	135	62	1,1	1	<b>52218</b>	120	326	1500	200
	155	88	1,5	1	<b>52318</b>	196	465	1200	1700
<b>80</b>	210	150	3	1,1	<b>52420</b>	365	965	750	1000
<b>85</b>	150	67	1,1	1	<b>52220</b>	147	410	1400	1900
	170	97	1,5	1	<b>52320</b>	236	596	1100	1600
<b>95</b>	160	67	1,1	1	<b>52222</b>	148	431	1300	1800
	190	110	2	1	<b>52322 MP</b>	275	720	950	1400
<b>100</b>	170	68	1,1	1,1	<b>52224</b>	154	472	1200	1700
	210	123	2,1	1,1	<b>52324 MP</b>	325	915	850	1200
<b>110</b>	190	80	1,5	1,1	<b>52226</b>	203	622	1100	1600
	225	130	2,1	1,1	<b>52326 MP</b>	360	1060	800	1100
<b>120</b>	200	81	1,5	1,1	<b>52228</b>	190	570	1000	1500
	240	140	2,1	1,1	<b>52328 MP</b>	400	1220	750	1000
<b>130</b>	215	89	1,5	1,1	<b>52230 MP</b>	236	735	950	1400
<b>140</b>	225	90	1,5	1,1	<b>52232 MP</b>	245	780	950	1400
<b>150</b>	240	97	1,5	1,1	<b>52234 MP</b>	285	930	850	1200

## Thrust Ball bearings, double direction

Abutment and fillet  
dimensions see on  
page 506

Shaft	Dimensions		Mass Bearing
	d	D <sub>1</sub>	
mm			[kg]
<b>70</b>	88	19	6,35
	88	30	17,80
<b>75</b>	93	14	3,22
	93	19	6,80
<b>80</b>	103	33	23,80
<b>85</b>	103	15	4,21
	103	21	8,94
<b>95</b>	113	15	4,63
	113	24	13,90
<b>100</b>	123	15	5,23
	123	27	19,40
<b>110</b>	133	18	7,99
	134	30	23,40
<b>120</b>	143	18	8,66
	144	31	28,20
<b>130</b>	153	20	11,40
<b>140</b>	163	20	12,10
<b>150</b>	173	21	14,90

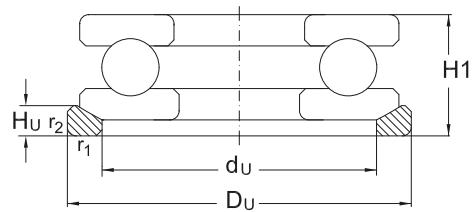
## Thrust Ball bearings, single direction, with Sphered Housing Washer



532/ 533/ 534

d	D	H	$r_1, r_2$ min.	Dimension		Designation	Basical dyn. $C_a$	axial load stat. $C_{0a}$	Speed limit	
				Bearing	Seating Washer				grease	oil
mm										
10	26	11,6	0,6	53200	U200	12,7	17	6000	8000	
12	28	11,4	0,6	53201	U201	13,2	19	6000	8000	
15	32	13,3	0,6	53202	U202	16,6	25	5000	6700	
17	35	13,2	0,6	53203	U203	17,3	27,5	5000	6700	
20	40	14,7	0,6	53204	U204	22,4	37,5	4300	5600	
25	47	16,7	0,6	53205	U205	28	50	3800	5000	
	52	19,8	1	53305	U305	34,5	55	3200	4300	
	60	26,4	1	53405	U405	56	90	2600	3600	
30	52	17,8	0,6	53206	U206	29,2	58,2	3600	4800	
	60	22,6	1	53306	U306	38	65,5	3000	4000	
	70	30,1	1	53406	U406	72	125	2200	3200	
35	62	19,9	1	53207	U207	35,5	67	3000	4000	
	68	25,6	1	53307	U307	50	88	2600	3600	
	80	34	1,1	53407	U407	86,5	156	2000	3000	
40	68	20,3	1	53208	U208	46,5	98	2800	3800	
	78	28,5	1	53308	U308	68	135	2200	3200	
	90	38,2	1,1	53408	U408	112	204	1700	2400	

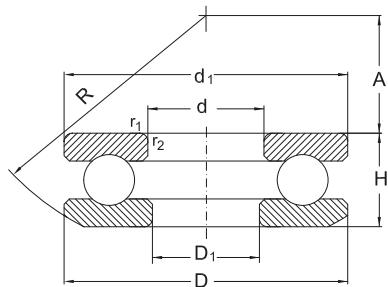
## Thrust Ball bearings, single direction, with Spherded Housing Washer



*Abutment and fillet dimensions see on page 505*

d	Dimensions									Mass	
	D <sub>1</sub>	d <sub>1</sub>	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm											[kg]
<b>10</b>	12	26	22	8,5	18	28	3,5	13	0,03	0,01	
<b>12</b>	14	28	25	11,5	20	30	3,5	13	0,03	0,012	
<b>15</b>	17	32	28	12	24	35	4	15	0,05	0,014	
<b>17</b>	19	35	32	16	26	38	4	15	0,06	0,015	
<b>20</b>	22	40	36	18	30	42	5	17	0,08	0,02	
<b>25</b>	27	47	40	19	36	50	5,5	19	0,12	0,032	
	27	52	45	21	38	55	6	22	0,18	0,044	
	27	60	50	19	42	62	8	29	0,41	0,072	
<b>30</b>	32	52	45	22	42	55	5,5	20	0,16	0,038	
	32	60	50	22	45	62	7	25	0,27	0,056	
	32	70	56	20	50	75	9	33	0,63	0,13	
<b>35</b>	37	62	50	24	48	65	7	22	0,22	0,057	
	37	68	56	24	52	72	7,5	28	0,38	0,084	
	37	80	64	23	58	85	10	37	0,92	0,17	
<b>40</b>	42	68	56	28,5	55	72	7	23	0,27	0,07	
	42	78	64	28	60	82	8,5	31	0,55	0,12	
	42	90	72	26	65	95	12	42	1,30	0,25	

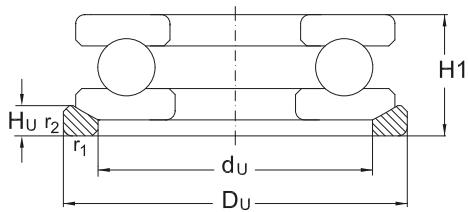
## Thrust Ball bearings, single direction, with Sphered Housing Washer



532/ 533/ 534

d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	Dimension		Designation Bearing	Seating Washer	Basical dyn. C <sub>a</sub>	axial load stat. C <sub>0a</sub>	Speed limit	
										grease	oil
mm		mm		mm		kN		min <sup>-1</sup>			
<b>45</b>	73	21,3	1	<b>53209</b>	<b>U209</b>	39	80	2600	3600		
	85	30,1	1	<b>53309</b>	<b>U309</b>	75	140	2000	3000		
	100	42,4	1,1	<b>53409</b>	<b>U409</b>	129	245	1600	2200		
<b>50</b>	78	23,5	1	<b>53210</b>	<b>U210</b>	50	106	2400	3400		
	95	34,3	1,1	<b>53310</b>	<b>U310</b>	88	173	1900	2800		
	110	45,6	1,5	<b>53410</b>	<b>U410</b>	156	310	1500	2000		
<b>55</b>	90	27,3	1	<b>53211</b>	<b>U211</b>	61	134	2200	3200		
	105	39,3	1,1	<b>53311</b>	<b>U311</b>	102	208	1700	2400		
	120	50,5	1,5	<b>53411</b>	<b>U411</b>	180	360	1300	1800		
<b>60</b>	95	28	1	<b>53212</b>	<b>U212</b>	62	140	2000	3000		
	110	38,3	1,1	<b>53312</b>	<b>U312</b>	102	208	1600	2200		
	130	54	1,5	<b>53412 FP</b>	<b>U412</b>	200	400	1200	1700		
<b>65</b>	100	28,7	1	<b>53213</b>	<b>U213</b>	64	150	2000	3000		
	115	39,4	1,1	<b>53313</b>	<b>U313</b>	106	220	1600	2200		
	140	60,2	2	<b>53413 FP</b>	<b>U413</b>	216	450	1100	1600		
<b>70</b>	105	28,8	1	<b>53214</b>	<b>U214</b>	71	179	1900	2800		
	125	44,2	1,1	<b>53314</b>	<b>U314</b>	137	300	1400	1900		
	150	63,6	2	<b>53414 FP</b>	<b>U414</b>	236	500	1100	1600		

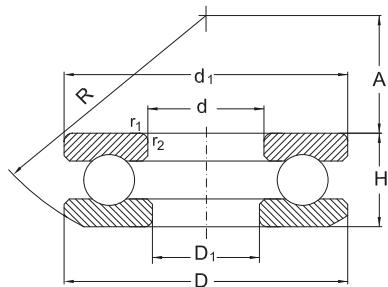
## Thrust Ball bearings, single direction, with Spherized Housing Washer



*Abutment and fillet dimensions see on page 505*

d	Dimensions									Mass	
	D <sub>1</sub>	d <sub>1</sub>	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm										[kg]	
<b>45</b>	47	73	56	26	60	78	7,5	24	0,30	0,087	
	47	85	64	25	65	90	10	33	0,66	0,17	
	47	100	80	29	72	105	12,5	46	1,77	0,32	
<b>50</b>	52	78	64	32,5	62	82	7,5	26	0,37	0,098	
	52	95	72	28	72	100	11	37	0,97	0,23	
	52	110	90	35	80	115	14	50	2,33	0,41	
<b>55</b>	57	90	72	35	72	95	9	30	0,60	0,152	
	57	105	80	30	80	110	11,5	42	1,38	0,28	
	57	120	90	28	88	125	15,5	55	3,08	0,53	
<b>60</b>	62	95	72	32,5	78	100	9	31	0,66	0,16	
	62	110	90	41	85	115	11,5	42	1,41	0,31	
	62	130	100	34	95	135	16	58	3,94	0,71	
<b>65</b>	67	100	80	40	82	105	9	32	0,73	0,18	
	67	115	90	38,5	90	120	12,5	43	1,53	0,34	
	68	140	112	40	100	145	17,5	65	5,05	0,81	
<b>70</b>	72	105	80	38	88	110	9	32	0,78	0,185	
	72	125	100	43	98	130	13	48	2,10	0,41	
	73	150	112	34	110	155	19,5	69	6,09	0,99	

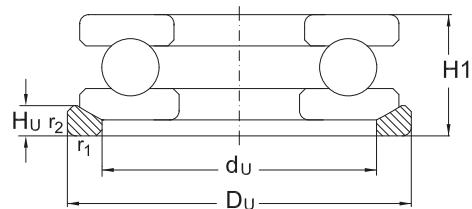
## Thrust Ball bearings, single direction, with Sphered Housing Washer



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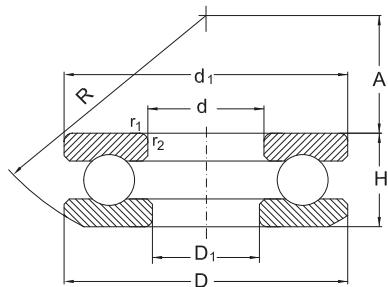
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	Dimension		Designation Bearing	Seating Washer	Basical dyn. C <sub>a</sub>	axial load stat. C <sub>0a</sub>	Speed limit	
										grease	oil
mm						kN					
<b>75</b>	110	28,3	1	<b>53215</b>	<b>U215</b>	67	170	1900	2800		
	135	48,1	1,5	<b>53315</b>	<b>U315</b>	163	360	1300	1800		
	160	69	2	<b>53415 FP</b>	<b>U415</b>	250	560	1000	1500		
<b>80</b>	115	29,5	1	<b>53216</b>	<b>U216</b>	75	190	1800	2600		
	140	47,6	1,5	<b>53316</b>	<b>U316</b>	160	360	1300	1800		
	170	72,2	2,1	<b>53416 FP</b>	<b>U416</b>	270	620	950	1400		
<b>85</b>	125	33,1	1	<b>53217</b>	<b>U217</b>	98	250	1600	2200		
	150	53,1	1,5	<b>53317</b>	<b>U317</b>	190	425	1200	1700		
	180	77	2,1	<b>53417 FP</b>	<b>U417</b>	290	680	900	1300		
<b>90</b>	135	38,5	1,1	<b>53218</b>	<b>U218</b>	120	300	1500	2000		
	155	54,6	1,5	<b>53318</b>	<b>U318</b>	196	465	1200	1700		
	190	81,2	2,1	<b>53418 FP</b>	<b>U418</b>	305	750	850	1300		
<b>100</b>	150	40,9	1,1	<b>53220</b>	<b>U220</b>	122	320	1400	1900		
	170	59,2	1,5	<b>53320</b>	<b>U320</b>	232	560	1100	1600		
	210	90	3	<b>53420 FP</b>	<b>U420</b>	565	965	750	1000		
<b>110</b>	160	40,2	1,1	<b>53222</b>	<b>U222</b>	129	360	1300	1800		
	190	67,2	2	<b>53322</b>	<b>U322</b>	275	720	950	1400		
	230	99,7	3	<b>53422 FP</b>	<b>U422</b>	415	1140	700	950		

## Thrust Ball bearings, single direction, with Spherded Housing Washer



d	Dimensions									Mass	
	D <sub>1</sub>	d <sub>1</sub>	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm										[kg]	
<b>75</b>	77	110	90	49	92	115	9,5	32	0,81	0,21	
	77	135	100	37	105	140	15	52	2,67	0,55	
	78	160	125	42	115	165	21	75	7,54	1,23	
<b>80</b>	82	115	90	46	98	120	10	33	0,90	0,22	
	82	140	112	50	110	145	15	52	2,77	0,57	
	83	170	125	36	125	175	22	78	8,93	1,38	
<b>85</b>	88	125	100	52	105	130	11	37	1,22	0,29	
	88	150	112	43	115	155	17,5	58	3,53	0,81	
	88	177	140	47	130	185	23	83	10,60	1,64	
<b>90</b>	93	135	100	45	110	140	13,5	42	1,70	0,42	
	93	155	112	40	120	160	18	59	3,83	0,84	
	93	187	140	40	140	195	25,5	88	12,30	1,9	
<b>100</b>	103	150	112	52	125	155	14	45	2,22	0,5	
	103	170	125	46	135	175	18	64	4,98	0,95	
	103	205	160	50	155	220	27	98	16,40	2,9	
<b>110</b>	113	160	125	65	135	165	14	45	2,37	0,56	
	113	187	140	51	150	195	20,5	72	7,83	1,28	
	113	225	180	59	170	240	29	109	22,00	3,7	

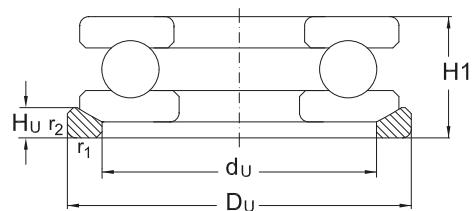
## Thrust Ball bearings, single direction, with Sphered Housing Washer



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d	D	H	$r_1, r_2$ min.	Dimension		Designation	Basical dyn. $C_a$	axial load stat. $C_{0a}$	Speed limit	
				Bearing	Seating Washer				grease	oil
mm										
120	170	40,8	1,1	53224	U224	140	400	1200	1700	
	210	74,1	2,1	53324 MP	U324	325	915	850	1200	
	250	107,3	4	53424 FP	U424	425	1220	670	900	
130	190	47,9	1,5	53226	U226	183	540	1100	1600	
	225	80,3	2,1	53326 MP	U326	360	1060	800	1100	
	270	115,2	4	53426 FP	U426	520	1600	600	800	
140	200	48,6	1,5	53228	U228	190	570	1000	1500	
	240	84,9	2,1	53328 MP	U328	400	1220	750	1000	
150	215	53,3	1,5	53230 MP	U230	236	735	950	1400	
	250	83,7	2,1	53330 MP	U330	405	1290	700	950	
160	225	54,7	1,5	53232 MP	U232	245	780	950	1400	
170	240	58,7	1,5	53234 MP	U234	285	930	850	1200	
180	250	58,2	1,5	53236 MP	U236	290	1000	700	1100	
190	270	65,7	2	53238 MP	U238	335	1160	600	1000	

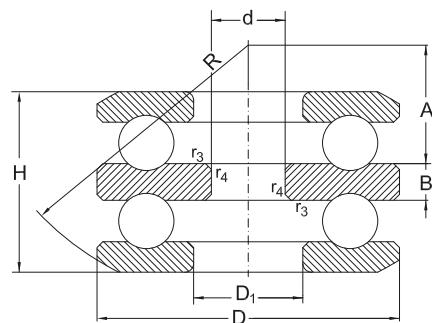
## Thrust Ball bearings, single direction, with Spherded Housing Washer



*Abutment and fillet dimensions see on page 505*

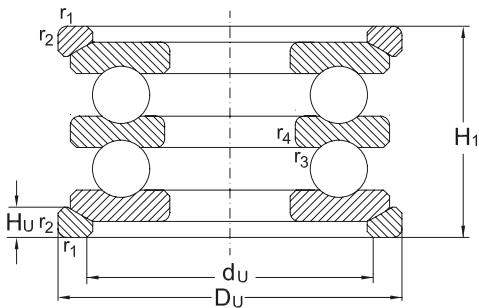
d	Dimensions									Mass	
	D <sub>1</sub>	d <sub>1</sub>	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm										[kg]	
<b>120</b>	123	170	125	61	145	175	15	46	2,57	0,65	
	123	205	160	63	165	220	22	80	10,60	2	
	123	245	200	70	185	260	32	118	28,10	4,7	
<b>130</b>	133	187	140	67	160	195	17	53	3,93	0,9	
	134	220	160	53	177	235	26	86	12,90	2,5	
	134	265	200	58	200	280	38	128	34,60	6,4	
<b>140</b>	143	197	160	87	170	210	17	55	4,27	1,22	
	144	235	180	68	190	250	26	92	15,60	2,9	
<b>150</b>	153	212	160	79	180	225	20,5	60	5,81	1,69	
	154	245	200	89,5	200	260	26	92	16,10	3,1	
<b>160</b>	163	222	160	74	190	235	21	61	6,44	1,81	
<b>170</b>	173	237	180	91	200	250	21,5	65	7,91	2,14	
<b>180</b>	183	245	200	112	210	260	21,5	66	8,19	1,06	
<b>190</b>	195	265	200	98	230	280	23	73	11,50	2,6	

## Thrust Ball bearings, double direction, with Sphered Housing Washer



Shaft d	Dimension H	Designation		Seating Washer	Basical dyn. $C_a$	axial load stat. $C_{0a}$	Speed limit	
		Bearing					grease	oil
mm								
<b>10</b>	32	24,6	0,6	0,3	<b>54202</b>	<b>U202</b>	16,6	25
<b>15</b>	40	27,4	0,6	0,3	<b>54204</b>	<b>U204</b>	22,4	37,5
	60	49,7	1	0,6	<b>54405</b>	<b>U405</b>	56	90
<b>20</b>	47	31,4	0,6	0,3	<b>54205</b>	<b>U205</b>	28	50
	52	37,6	1	0,3	<b>54305</b>	<b>U305</b>	34,5	55
	70	56,2	1	0,6	<b>54406</b>	<b>U406</b>	72	125
<b>25</b>	52	32,6	0,6	0,3	<b>54206</b>	<b>U206</b>	25,5	47,5
	60	41,3	1	0,3	<b>54306</b>	<b>U306</b>	38	65,5
	80	63,1	1,1	0,6	<b>54407</b>	<b>U407</b>	86,5	156
<b>30</b>	62	37,8	1	0,3	<b>54207</b>	<b>U207</b>	35,5	67
	68	38,6	1	0,6	<b>54208</b>	<b>U208</b>	46,5	98
	68	47,2	1	0,3	<b>54307</b>	<b>U307</b>	50	88
	78	54,1	1	0,6	<b>54308</b>	<b>U308</b>	61	112
	90	69,5	1,1	0,6	<b>54408</b>	<b>U408</b>	112	204
<b>35</b>	73	39,6	1	0,6	<b>54209</b>	<b>U209</b>	39	80
	85	56,3	1	0,6	<b>54309</b>	<b>U309</b>	75	140
	100	78,9	1,1	0,6	<b>54409</b>	<b>U409</b>	129	245
<b>40</b>	78	42	1	0,6	<b>54210</b>	<b>U210</b>	50	106

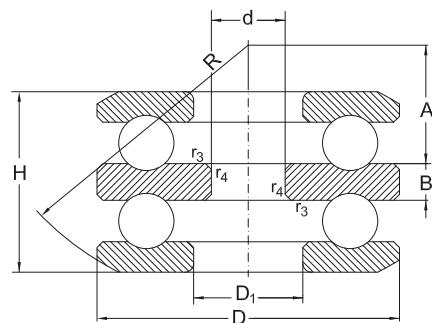
## Thrust Ball bearings, double direction, with Spherded Housing Washer



Abutment and fillet dimensions see on page 507

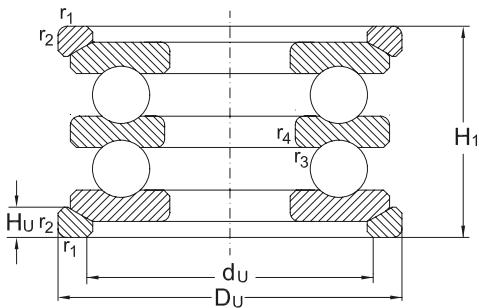
d	Dimensions									Mass	
	D <sub>1</sub>	B	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm										[kg]	
<b>10</b>	17	5	28	10,5	24	35	4	28	0,09	0,01	
<b>15</b>	22	6	36	16	30	42	5	32	0,15	0,02	
	27	11	50	15	42	62	8	55	0,50	0,07	
<b>20</b>	27	7	40	16,5	36	50	5,5	36	0,23	0,03	
	27	8	45	18	38	55	6	42	0,32	0,04	
	32	12	56	16	50	75	9	62	0,73	0,13	
<b>25</b>	32	7	45	20	42	55	5,5	37	0,27	0,04	
	32	9	50	19,5	45	62	7	46	0,47	0,06	
	37	14	64	18,5	58	85	10	69	1,08	0,17	
<b>30</b>	37	8	50	21	48	65	7	42	0,42	0,06	
	42	9	56	25	55	72	7	44	0,56	0,07	
	37	10	56	21	52	72	7,5	52	0,68	0,08	
	42	12	64	23,5	60	82	8,5	59	1,06	0,12	
	42	15	72	22	65	95	12	77	1,51	0,25	
<b>35</b>	47	9	56	23	60	78	7,5	45	0,60	0,09	
	47	12	64	21	65	90	10	62	1,24	0,17	
	47	17	80	23,5	72	105	12,5	86	2,08	0,32	
<b>40</b>	52	9	64	30,5	62	82	7,5	47	0,70	0,10	

## Thrust Ball bearings, double direction, with Sphered Housing Washer



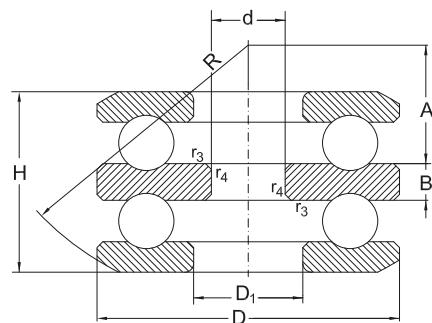
Shaft d	Dimension D	Designation				Basical dyn. $C_a$	axial load stat. $C_{0a}$	Speed limit		
		H	$r_1, r_2$ min.	$r_3, r_4$ min.	Bearing	Seating Washer		grease	oil	
mm										
<b>40</b>	95	64,7	1,1	0,6	<b>54310</b>	<b>U310</b>	88	173	1900	2800
	110	83,2	1,5	0,6	<b>54410</b>	<b>U410</b>	156	310	1500	2000
<b>45</b>	90	49,6	1	0,6	<b>54211</b>	<b>U211</b>	61	134	2200	3200
	105	72,6	1,1	0,6	<b>54311</b>	<b>U311</b>	102	208	1700	2400
	120	92	1,5	0,6	<b>54411</b>	<b>U411</b>	180	360	1300	1800
<b>50</b>	95	50	1	0,6	<b>54212</b>	<b>U212</b>	62	140	2000	3000
	110	70,7	1,1	0,6	<b>54312</b>	<b>U312</b>	102	208	1600	2200
	130	99	1,5	0,6	<b>54412</b>	<b>U412</b>	200	400	1200	1700
	140	109,4	2	1	<b>54413</b>	<b>U413</b>	216	450	1100	1600
<b>55</b>	100	50,4	1	0,6	<b>54213</b>	<b>U213</b>	64	150	2000	3000
	105	50,6	1	1	<b>54214</b>	<b>U214</b>	65,5	160	1900	2800
	115	71,9	1,1	0,6	<b>54313</b>	<b>U313</b>	106	220	1600	2200
	125	80,3	1,1	1	<b>54314</b>	<b>U314</b>	137	300	1400	1900
	150	114,1	2	1	<b>54414</b>	<b>U414</b>	236	500	1100	1600
<b>60</b>	110	49,6	1	1	<b>54215</b>	<b>U215</b>	67	170	1900	2800
	135	87,2	1,5	1	<b>54315</b>	<b>U315</b>	163	360	1300	1800
	160	123	2	1	<b>54415</b>	<b>U415</b>	250	560	1000	1500
<b>65</b>	115	51	1	1	<b>54216</b>	<b>U216</b>	75	190	1800	2600

## Thrust Ball bearings, double direction, with Spherded Housing Washer



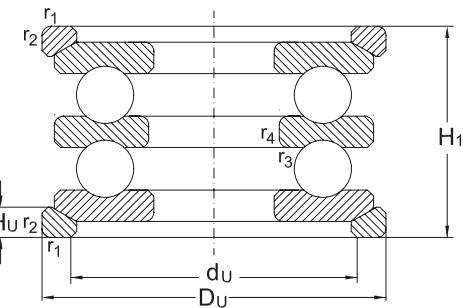
d	Dimensions									Mass	
	D <sub>1</sub>	B	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm											[kg]
<b>40</b>	52	14	72	23	72	100	11	70	1,83	0,23	
	52	18	90	30	80	115	14	92	2,68	0,41	
<b>45</b>	57	10	72	32,5	72	95	9	55	1,13	0,15	
	57	15	80	25,5	80	110	11,5	78	2,54	0,28	
	57	20	90	22,5	88	125	15,5	101	3,49	0,53	
<b>50</b>	62	10	72	30,5	78	100	9	56	1,22	0,16	
	62	15	90	36,5	85	115	11,5	78	2,62	0,31	
	62	21	100	28	95	135	16	107	4,41	0,71	
	68	23	112	34	100	145	17,5	119	5,67	0,81	
<b>55</b>	67	10	80	38,5	82	105	9	57	1,33	0,18	
	72	10	80	36,5	88	110	9	57	1,47	0,19	
	67	15	90	34,5	90	120	12,5	79	2,82	0,34	
	72	16	100	39	98	130	13	88	3,87	0,41	
	73	24	112	28,5	110	155	19,5	125	6,77	0,99	
<b>60</b>	77	10	90	47,5	92	115	9,5	57	1,54	0,21	
	77	18	100	32,5	105	140	15	95	4,92	0,55	
	78	26	125	36,5	115	165	21	135	8,33	1,23	
<b>65</b>	82	10	90	45	98	120	10	58	1,70	0,22	

## Thrust Ball bearings, double direction, with Spherized Housing Washer



Shaft d	Dimension D	H	Designation		Seating Washer	Basical dyn. $C_a$	axial load stat. $C_{0a}$	Speed limit		
			$r_1, r_2$ min.	$r_3, r_4$ min.				grease	oil	
mm										
<b>65</b>	140	86,1	1,5	1	<b>54316</b>	<b>U316</b>	160	360	1300	1800
	170	128,5	2,1	1	<b>54416</b>	<b>U416</b>	270	620	950	1400
	180	138	2,1	1,1	<b>54417</b>	<b>U417</b>	290	680	900	1300
<b>70</b>	125	59,2	1	1	<b>54217</b>	<b>U217</b>	98	250	1600	2200
	150	95,2	1,5	1	<b>54317</b>	<b>U317</b>	190	425	1200	1700
	190	143,5	2,1	1,1	<b>54418</b>	<b>U418</b>	305	750	850	1200
<b>75</b>	135	69	1,1	1	<b>54218</b>	<b>U218</b>	120	300	1500	2000
	155	97,1	1,5	1	<b>54318</b>	<b>U318</b>	196	465	1200	1700
<b>80</b>	210	159,9	3	1,1	<b>54420</b>	<b>U420</b>	365	965	750	1000
<b>85</b>	150	72,8	1,1	1	<b>54220</b>	<b>U220</b>	122	320	1400	1900
	170	105,4	1,5	1	<b>54320</b>	<b>U320</b>	132	560	1100	1600
<b>95</b>	160	71,4	1,1	1	<b>54222</b>	<b>U222</b>	129	360	1300	1800
	190	118,4	2	1	<b>54322 MP</b>	<b>U322</b>	275	720	950	1400
<b>100</b>	170	71,6	1,1	1,1	<b>54224</b>	<b>U224</b>	140	400	1200	1700
	210	131,2	2,1	1,1	<b>54324 MP</b>	<b>U324</b>	325	915	850	1200
<b>110</b>	190	85,8	1,5	1,1	<b>54226</b>	<b>U226</b>	183	540	1100	1600

## Thrust Ball bearings, double direction, with Spherated Housing Washer



Abutment and fillet dimensions see on page 507

d	Dimensions									Mass	
	D <sub>1</sub>	B	R	A	d <sub>U</sub>	D <sub>U</sub>	H <sub>U</sub>	H <sub>1</sub>	Bearing	Seating Washer	
mm										[kg]	
<b>65</b>	82	18	112	45,5	110	145	15	95	5,05	0,57	
	83	27	125	30,5	125	175	22	140	9,76	1,38	
	88	29	140	40,5	130	185	23	150	8,64	1,64	
<b>70</b>	88	12	100	49,5	105	130	11	67	2,39	0,29	
	88	19	112	39	115	155	17,5	105	6,36	0,81	
	93	30	140	34,5	140	195	25,2	157	13,60	1,90	
<b>75</b>	93	14	100	42	110	140	13,5	76	3,27	0,42	
	93	19	112	36,5	120	160	18	106	6,86	0,84	
<b>80</b>	103	33	160	43,5	155	220	27	176	18,20	2,90	
<b>85</b>	103	15	112	49	125	155	14	81	4,23	0,50	
	103	21	125	42	135	175	18	115	8,99	0,95	
<b>95</b>	113	15	125	62	135	165	14	81	4,57	0,56	
	113	24	140	55	150	195	20,5	128	12,10	1,28	
<b>100</b>	123	15	125	58,5	145	175	15	82	5,05	0,65	
	123	27	160	58	165	220	22	143	19,10	2,00	
<b>110</b>	133	18	140	63	160	195	17	96	7,78	0,90	



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URB

# Cylindrical Roller Thrust Bearings

## Cylindrical Roller Thrust Bearings

Standards, Boundary dimensions	
Standard plans	DIN 616
Cylindrical roller thrust bearings	DIN 722

### General

**Cylindrical Roller Thrust Bearings** series **811** and **812** are single direction acting separable axial bearings.

Cylindrical roller thrust bearings are insensitive to shock loading and feature much higher load carrying capacity compared to thrust ball bearings. They accommodate very high axial loads but no radial forces. They provide a very rigid bearing assembly for high thrust loading with less space requirement.

**Cylindrical roller thrust bearings** are of simple design, they consist of a **shaft washer (WS)**, a **housing washer (GS)**, and a **cylindrical roller**

and **cage thrust assembly (K)**, see Abb. 1.

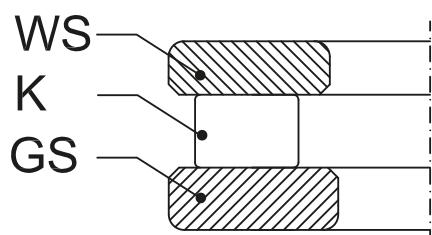
With all cylindrical roller thrust bearings, increased sliding friction can occur at the end of the cylindrical rollers.

In order to minimise this negative effect, **URB cylindrical roller thrust bearings with wider sectional widths** are produced using several short rollers in each cage pockets instead of using individual longer rollers.

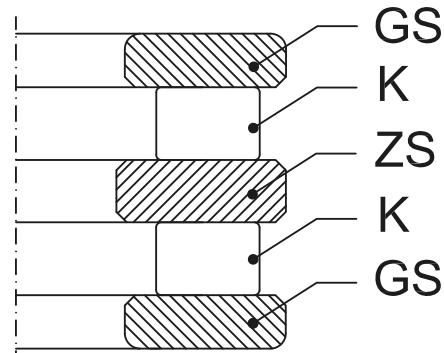
Due to their specific kinematic behaviour, cylindrical roller thrust bearings are only suitable for low speed applications only. Furthermore, they require minimal axial loads for their optimum function.

### Design variants

**URB cylindrical roller thrust bearings** are produced in single direction design only as standard (see Abb. 1a)



a



b

**Double direction acting cylindrical roller thrust bearings** are built using a combination of the components from single direction acting cylindrical roller thrust bearings together with **intermediate washers ZS**, (see Abb. 1 b).

Such intermediate washers are part of URB supplementary product range and are available on request.

For application designs with space restrictions the cylindrical roller and cage thrust assemblies may be used without washers providing the contact faces of adjacent machine parts are machined as bearing raceways, (e.g. hardened and ground, etc).

The components of cylindrical roller thrust bearing are frequently used either separately or in conjunction with other components in several applications (e.g. to build needle roller thrust assemblies) therefore, they are available as loose parts.

#### Misalignment

**All cylindrical roller thrust bearing type do not allow any misalignment.**

The contacting surfaces of both shaft and housing seats must be parallel.

#### Cages

Small URB cylindrical roller thrust bearings are fitted with shaft - centred polyamide cages as standard. Polyamide cages are suitable for operating temperatures up to +120°C.

Large cylindrical roller thrust bearings are produced with either solid brass cages (suffix **MP**), or with solid steel cages, (suffix **FP**).

#### Tolerances

**URB cylindrical roller thrust bearings** are produced to normal class tolerance (**PN**) as standard.

For applications of higher accuracy these bearings are produced to precision tolerance class (e.g. **P6**) on order request.

For detailed values of the tolerance classes see chapter "**Bearing tolerances**" (see page 41).

#### Minimum load:

All cylindrical roller thrust bearing require a certain minimum axial load to ensure a satisfactory operating function.

To prevent excessive sliding friction, the minimum axial load applied should be greater than **5%** of the axial bearing dynamic load rating **C<sub>a</sub>**.

Where such a minimum axial load is not possible the load must be increased by effective measures, (i.e. preloading the bearing) using pressure washers or springs.

#### Equivalent dynamic bearing load

Cylindrical roller thrust bearings are pure axial bearings, they are not able to accomodate any radial loads, therefore:

$$P = F_a$$

#### Equivalent static bearing load

For cylindrical roller thrust bearings:

$$P_0 = F_a$$

#### Design of adjacent machine parts

When **cylindrical roller and cage thrust assemblies** are used without washers adjacent machines parts must be designed and machined as bearing raceways (e.g. hardened and ground etc).

The maximum permissible axial runout of the adjacent surfaces acting as raceway must also meet the requirements of the respective washers.

For detailed information see chapter "**Design of bearing location**", on page 46.

The bore diameters of **URB cylindrical roller and cage thrust assemblies** have tolerances according to ISO Tolerance field (**E11**), whilst the tolerance of their outer diameters lies in the tolerance field (**a13**).

**Cylindrical roller and cage thrust assemblies** require an effective guidance when operating at higher speeds.

To avoid excessive wear, at higher speeds, the guiding surface must be ground.

#### Bearing seats for cylindrical roller thrust bearings

For the design of cylindrical roller thrust bearing seats the following of tolerance fields have proven to be satisfactory in practice:

Centred at	Tolerance field	
	Shaft	Housing
Cylindrical roller and cage thrust assembly	h8	H9
Shaft washer	h6	-
Housing washer	-	H7

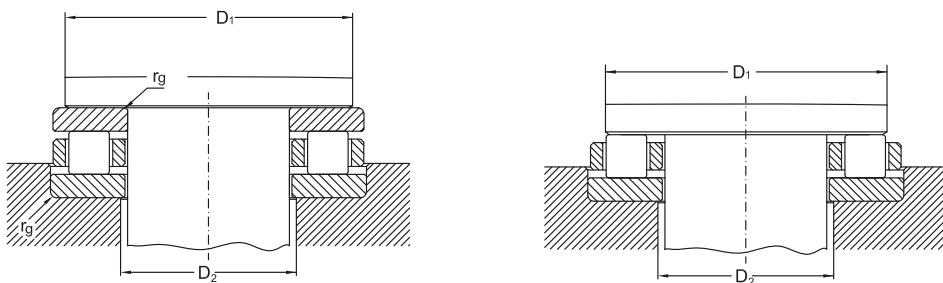
#### Abutment and Fillet dimensions for cylindrical roller thrust bearings

In case of cylindrical roller thrust bearings, an effective support of the bearing washers over the total width of their raceways by adjacent machine parts is necessary.

The bearing washer must contact adjacent parts with their side face only. The fillet radii of bearing corners must not touch the shoulder fillet radii of the shaft or housing shoulders.

Therefore, the largest fillet radius ( $r_g$ ) must be smaller than the minimum fillet dimension of the bearing rings ( $r_s$ ) as listed in the following tables.

**Abutment and Fillet dimensions for cylindrical roller thrust bearings,  
series 811 and 812 [mm]**

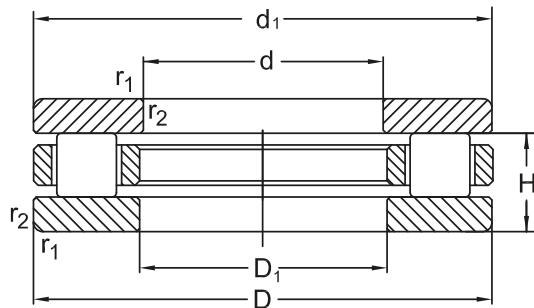


Shaft reference number	Bore reference number	Bearing Series		
		811	812	
Φd		D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max
mm				
15	02	25	18	0,3
17	03	27	20	0,3
20	04	32	23	0,3
25	05	39	28	0,6
30	06	44	33	0,6
35	07	49	38	0,6
40	08	56	44	0,6
45	09	61	49	0,6
50	10	66	54	0,6
55	11	73	60	0,6
60	12	80	65	1
65	13	85	70	1
70	14	90	75	1
75	15	95	80	1
80	16	100	85	1
85	17	105	90	1
90	18	114	96	1
100	20	129	106	1
110	22	139	116	1
120	24	149	126	1
130	26	162	138	1
140	28	172	148	1
150	30	182	158	1

**Abutment and Fillet dimensions for cylindrical roller thrust bearings,  
series 811 and 812 [mm]**

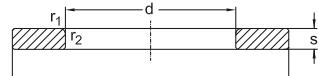
Shaft Φd	Bore reference number	Bearing Series					
		811			812		
mm		D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max	D <sub>1</sub> min	D <sub>2</sub> min	r <sub>g</sub> max
160	32	192	168	1	214	171	1,5
170	34	207	178	1	227	183	1,5
180	36	217	188	1	237	193	1,5
190	38	230	200	1	256	204	2
200	40	240	210	1	266	214	2
220	44	260	230	1	286	234	2
240	48	288	252	1,5	322	258	2,1
260	52	308	272	1,5	342	278	2,1
280	56	337	293	1,5	362	298	2,1
300	60	365	315	2	398	322	2,5
320	64	385	335	2	418	342	2,5
340	68	405	355	2	438	362	2,5
360	72	425	375	2	475	385	3
380	76	445	395	2	495	405	3
400	80	465	415	2	515	425	3
420	84	485	435	2	552	448	4
440	88	522	458	2,1	572	468	4
460	92	542	478	2,1	592	488	4
480	96	562	498	2,1	621	509	4
500	/500	582	518	2,1	641	529	4
530	/530	619	551	2,5	680	560	4
560	/560	649	581	2,5	715	595	4
600	/600	689	621	2,5	764	636	4

## Cylindrical Roller Thrust Bearings



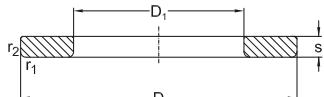
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	Designation	Basical axial load		Speed limit	
					dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	grease min <sup>-1</sup>	oil min <sup>-1</sup>
mm								
<b>30</b>	47	11	0,6	<b>81106</b>	28	83	2600	6700
	52	16	0,6	<b>81206</b>	50	132	2400	6300
<b>35</b>	52	12	0,6	<b>81107</b>	30	93	2200	6000
	62	18	1	<b>81207</b>	54	156	1900	5300
<b>40</b>	60	13	0,6	<b>81108</b>	42,5	137	1900	5300
	68	19	1	<b>81208</b>	76,5	220	1700	4800
<b>45</b>	65	14	0,6	<b>81109</b>	45	150	1700	4800
	73	20	1	<b>81209</b>	83	255	1600	4500
<b>50</b>	70	14	0,6	<b>81110</b>	42,5	143	1500	4300
	78	22	1	<b>81210</b>	88	285	1400	4000
<b>55</b>	78	16	0,6	<b>81111</b>	52	193	1400	4000
	90	25	1	<b>81211</b>	122	390	1200	3600
<b>60</b>	85	17	1	<b>81112</b>	73,5	265	1200	3600
	95	26	1	<b>81212</b>	114	335	1100	3400
<b>65</b>	90	18	1	<b>81113</b>	76,5	285	1100	3400
	100	27	1	<b>81213</b>	118	390	950	3000
<b>70</b>	95	18	1	<b>81114</b>	71	265	1000	3200
	105	27	1	<b>81214</b>	122	440	950	3000
<b>75</b>	100	19	1	<b>81115</b>	75	285	950	3000
	110	27	1	<b>81215</b>	125	440	900	2800
<b>80</b>	105	19	1	<b>81116</b>	76,5	300	900	2800
	115	28	1	<b>81216</b>	129	455	850	2600

## Cylindrical Roller Thrust Bearings

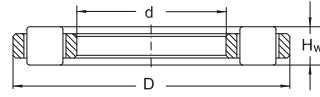


WS 8...

*Abutment and fillet dimensions see on page 547*



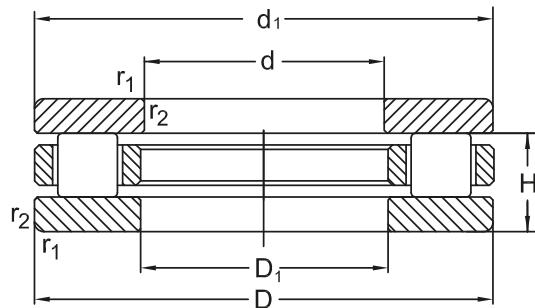
GS 8...



K 8...

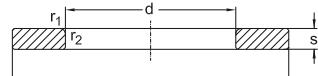
d	$d_1$	$D_1$	S	Designation of Bearing Components			Mass [kg]
				Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							
<b>30</b>	47	32	3	<b>K81106</b>	<b>WS81106</b>	<b>GS81106</b>	0,06
	52	32	4,25	<b>K81206</b>	<b>WS81206</b>	<b>GS81206</b>	0,13
<b>35</b>	52	37	3,5	<b>K81107</b>	<b>WS81107</b>	<b>GS81107</b>	0,08
	62	37	5,25	<b>K81207</b>	<b>WS81207</b>	<b>GS81207</b>	0,23
<b>40</b>	60	42	3,5	<b>K81108</b>	<b>WS81108</b>	<b>GS81108</b>	0,12
	68	42	5	<b>K81208</b>	<b>WS81208</b>	<b>GS81208</b>	0,27
<b>45</b>	65	47	4	<b>K81109</b>	<b>WS81109</b>	<b>GS81109</b>	0,14
	73	47	5,5	<b>K81209</b>	<b>WS81209</b>	<b>GS81209</b>	0,31
<b>50</b>	70	52	4	<b>K81110</b>	<b>WS81110</b>	<b>GS81110</b>	0,16
	78	52	6,5	<b>K81210</b>	<b>WS81210</b>	<b>GS81210</b>	0,38
<b>55</b>	78	57	5	<b>K81111</b>	<b>WS81111</b>	<b>GS81111</b>	0,23
	90	57	7	<b>K81211</b>	<b>WS81211</b>	<b>GS81211</b>	0,60
<b>60</b>	85	62	4,75	<b>K81112</b>	<b>WS81112</b>	<b>GS81112</b>	0,28
	95	62	7,5	<b>K81212</b>	<b>WS81212</b>	<b>GS81212</b>	0,74
<b>65</b>	90	67	5,25	<b>K81113</b>	<b>WS81113</b>	<b>GS81113</b>	0,33
	100	67	8	<b>K81213</b>	<b>WS81213</b>	<b>GS81213</b>	0,82
<b>70</b>	95	72	5,25	<b>K81114</b>	<b>WS81114</b>	<b>GS81114</b>	0,36
	105	72	8	<b>K81214</b>	<b>WS81214</b>	<b>GS81214</b>	0,87
<b>75</b>	100	77	5,75	<b>K81115</b>	<b>WS81115</b>	<b>GS81115</b>	0,43
	110	77	8	<b>K81215</b>	<b>WS81215</b>	<b>GS81215</b>	0,92
<b>80</b>	105	82	5,75	<b>K81116</b>	<b>WS81116</b>	<b>GS81116</b>	0,46
	115	82	8,5	<b>K81216</b>	<b>WS81216</b>	<b>GS81216</b>	1,02

## Cylindrical Roller Thrust Bearings



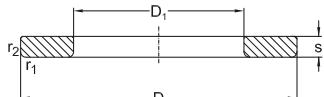
d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	Designation	Basical axial load		Speed limit	
					dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	grease	oil
mm								
<b>85</b>	110	19	1	<b>81117</b>	76,5	310	850	2600
	125	31	1	<b>81217</b>	153	550	800	2400
<b>90</b>	120	22	1	<b>81118</b>	104	415	800	2400
	135	35	1,1	<b>81218</b>	190	670	800	2400
<b>100</b>	135	25	1	<b>81120</b>	146	585	750	2200
	150	38	1,1	<b>81220</b>	224	815	700	2000
<b>110</b>	145	25	1	<b>81122</b>	160	655	700	2000
	160	38	1,1	<b>81222</b>	232	865	670	1900
<b>120</b>	155	25	1	<b>81124</b>	160	680	670	1900
	170	39	1,1	<b>81224</b>	245	950	630	1800
<b>130</b>	170	30	1	<b>81126</b>	186	780	600	1700
	190	45	1,5	<b>81226</b>	365	1400	560	1600
<b>140</b>	180	31	1	<b>81128</b>	196	865	560	1600
	200	46	1,5	<b>81228</b>	375	1460	530	1500
<b>150</b>	190	31	1	<b>81130</b>	204	930	530	1500
	215	50	1,5	<b>81230</b>	455	1800	500	1400
<b>160</b>	200	31	1	<b>81132</b>	212	980	500	1400
	225	51	1,5	<b>81232</b>	465	1900	500	1400
<b>170</b>	215	34	1,1	<b>81134</b>	265	1220	500	1400
	240	55	1,5	<b>81234</b>	520	2080	480	1300
<b>180</b>	225	34	1,1	<b>81136</b>	275	1290	480	1300
	250	56	1,5	<b>81236</b>	520	2160	450	1200

## Cylindrical Roller Thrust Bearings

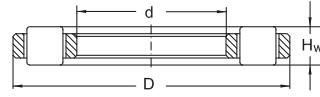


WS 8...

*Abutment and fillet dimensions see on page 547*



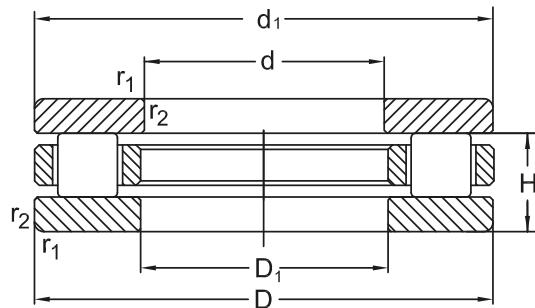
GS 8...



K 8...

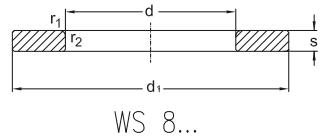
d	d <sub>1</sub>	D <sub>1</sub>	S	Designation of Bearing Components			Mass [kg]
				Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							
<b>85</b>	110	87	5,75	<b>K81117</b>	<b>WS81117</b>	<b>GS81117</b>	0,48
	125	88	9,5	<b>K81217</b>	<b>WS81217</b>	<b>GS81217</b>	1,36
<b>90</b>	120	92	6,5	<b>K81118</b>	<b>WS81118</b>	<b>GS81118</b>	0,72
	135	93	10,5	<b>K81218</b>	<b>WS81218</b>	<b>GS81218</b>	1,85
<b>100</b>	135	102	7	<b>K81120</b>	<b>WS81120</b>	<b>GS81120</b>	1,07
	150	103	11,5	<b>K81220</b>	<b>WS81220</b>	<b>GS81220</b>	2,45
<b>110</b>	145	112	7	<b>K81122</b>	<b>WS81122</b>	<b>GS81122</b>	1,12
	160	113	11,5	<b>K81222</b>	<b>WS81222</b>	<b>GS81222</b>	2,70
<b>120</b>	155	122	7	<b>K81124</b>	<b>WS81124</b>	<b>GS81124</b>	1,25
	170	123	12	<b>K81224</b>	<b>WS81224</b>	<b>GS81224</b>	2,98
<b>130</b>	170	132	9	<b>K81126</b>	<b>WS81126</b>	<b>GS81126</b>	1,72
	187	133	13	<b>K81226</b>	<b>WS81226</b>	<b>GS81226</b>	4,37
<b>140</b>	178	142	9,5	<b>K81128</b>	<b>WS81128</b>	<b>GS81128</b>	2,02
	197	143	13,5	<b>K81228</b>	<b>WS81228</b>	<b>GS81228</b>	4,76
<b>150</b>	188	152	9,5	<b>K81130</b>	<b>WS81130</b>	<b>GS81130</b>	2,15
	212	153	14,5	<b>K81230</b>	<b>WS81230</b>	<b>GS81230</b>	6,04
<b>160</b>	198	162	9,5	<b>K81132</b>	<b>WS81132</b>	<b>GS81132</b>	2,28
	222	163	15	<b>K81232</b>	<b>WS81232</b>	<b>GS81232</b>	6,52
<b>170</b>	213	172	10	<b>K81134</b>	<b>WS81134</b>	<b>GS81134</b>	3,01
	237	173	16,5	<b>K81234</b>	<b>WS81234</b>	<b>GS81234</b>	8,12
<b>180</b>	222	183	10	<b>K81136</b>	<b>WS81136</b>	<b>GS81136</b>	3,07
	247	183	17	<b>K81236</b>	<b>WS81236</b>	<b>GS81236</b>	8,69

## Cylindrical Roller Thrust Bearings

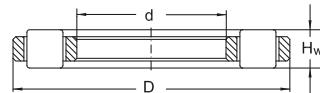
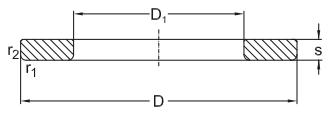


d	D	H	r <sub>1</sub> , r <sub>2</sub> min.	Dimension		Designation	Basical axial load dyn. C <sub>a</sub>	stat. C <sub>0a</sub>	Speed limit grease min <sup>-1</sup>	Speed limit oil min <sup>-1</sup>
				d	D					
mm										
<b>190</b>	240	37	1,1	<b>81138</b>		315	1500	450	1200	
	270	62	2	<b>81238</b>		655	2650	430	1100	
<b>200</b>	250	37	1,1	<b>81140</b>		325	1600	450	1200	
	280	62	2	<b>81240</b>		695	2900	430	1100	
<b>220</b>	270	37	1,1	<b>81144</b>		355	1830	430	1100	
	300	63	2	<b>81244</b>		735	3200	400	1000	
<b>240</b>	300	45	1,5	<b>81148</b>		465	2360	380	950	
	340	78	2,1	<b>81248</b>		980	4250	360	900	
<b>260</b>	320	45	1,5	<b>81152</b>		500	2650	360	900	
	360	79	2,1	<b>81252</b>		1040	4650	340	850	
<b>280</b>	350	53	1,5	<b>81156</b>		670	3450	340	850	
	380	80	2,1	<b>81256</b>		1060	4900	320	800	
<b>300</b>	380	62	2	<b>81160</b>		800	4000	300	750	
	420	95	3	<b>81260</b>		1400	6200	280	700	
<b>360</b>	440	65	2	<b>81172</b>		900	4900	240	630	
	500	110	4	<b>81272</b>		1960	9150	220	600	
<b>380</b>	460	65	2	<b>81176</b>		880	4900	240	630	
	520	112	4	<b>81276</b>		2000	9500	200	560	

## Cylindrical Roller Thrust Bearings



*Abutment and fillet dimensions see on page 547*



d	d <sub>1</sub>	D <sub>1</sub>	S	Designation of Bearing Components			Mass [kg]
				Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							
<b>190</b>	237	193	11	<b>K81138</b>	<b>WS81138</b>	<b>GS81138</b>	3,99
	267	194	18	<b>K81238</b>	<b>WS81238</b>	<b>GS81238</b>	11,70
<b>200</b>	247	203	11	<b>K81140</b>	<b>WS81140</b>	<b>GS81140</b>	4,17
	277	204	18	<b>K81240</b>	<b>WS81240</b>	<b>GS81240</b>	12,2
<b>220</b>	267	223	11	<b>K81144</b>	<b>WS81144</b>	<b>GS81144</b>	4,65
	297	224	18,5	<b>K81244</b>	<b>WS81244</b>	<b>GS81244</b>	13,4
<b>240</b>	297	243	13,5	<b>K81148</b>	<b>WS81148</b>	<b>GS81148</b>	7,43
	335	244	23	<b>K81248</b>	<b>WS81248</b>	<b>GS81248</b>	23,10
<b>260</b>	317	263	13,5	<b>K81152</b>	<b>WS81152</b>	<b>GS81152</b>	7,99
	355	264	23,5	<b>K81252</b>	<b>WS81252</b>	<b>GS81252</b>	25,1
<b>280</b>	347	283	15,5	<b>K81156</b>	<b>WS81156</b>	<b>GS81156</b>	12
	375	284	24	<b>K81256</b>	<b>WS81256</b>	<b>GS81256</b>	27,1
<b>300</b>	376	304	18,5	<b>K81160</b>	<b>WS81160</b>	<b>GS81160</b>	17,2
	415	304	28,5	<b>K81260</b>	<b>WS81260</b>	<b>GS81260</b>	42,50
<b>360</b>	436	364	20	<b>K81172</b>	<b>WS81172</b>	<b>GS81172</b>	21,4
	495	365	32,5	<b>K81272</b>	<b>WS81272</b>	<b>GS81272</b>	68,7
<b>380</b>	456	384	20	<b>K81176</b>	<b>WS81176</b>	<b>GS81176</b>	22,4
	515	385	33,5	<b>K81276</b>	<b>WS81276</b>	<b>GS81276</b>	73,3

## Cylindrical roller thrust bearings, single direction

Non-standardized

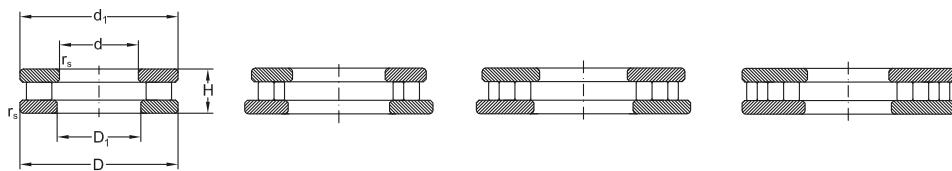


Fig. 1

Fig. 2

Fig. 3

Fig. 4

d	D	H	Dimensions		Fig.	Basic axial load		Speed limit		Designation Bearing	Mass
			r <sub>s</sub> min.	d <sub>1</sub>		dyn	stat. C <sub>a</sub>	grease	oil		
mm											
<b>25</b>	49	15	0,6	49	25,2	1	37,1	92,7	3400	<b>85205 M</b>	0,131
	52	18	0,5	52	25,2	1	36,8	92,4	3000	<b>85105 M</b>	0,181
<b>34,925</b>	79	15,875	1,5	78	37	2	80	316	2200	<b>892007 M</b>	0,43
<b>40</b>	91,035	15,5	0,3	87	45	3	92	378	2400	<b>85108 M</b>	0,500
	105	16	0,5	105	48	10	141	591	2800	<b>86208 M</b>	0,859
<b>46</b>	112,035	19	0,3	105	53	3	139	591	2000	<b>85109 M</b>	1,04
<b>50</b>	105	20	0,5	105,5	54,5	9	172	776	2300	<b>85110 TN</b>	0,655
	105	16	0,5	105,5	52	8	172	776	2800	<b>85210 TN</b>	0,633
<b>62</b>	138,04	22	0,6	134	70	3	215	950	1700	<b>85112 M</b>	1,87
<b>70</b>	95	6	0,3	-	72	1	46,2	234	3400	<b>85114 M</b>	0,154
<b>76,2</b>	228,6	35	1	227	77,7	1	436	1996	1000	<b>85115 M</b>	7,64
<b>85</b>	110	6	0,3	-	87	7	50	274	3000	<b>85117 M</b>	0,18
<b>96,15<sup>1)</sup></b>	181,6 <sup>1)</sup>	17,2	0,3	175,05	96,15	4	286	1774	1700	<b>85119 M</b>	2,39
<b>100</b>	210	67	3	208,5	103	2	669	2711	750	<b>85120 M</b>	12,7
<b>160</b>	345	120	4	314	160,3	2	1836	7603	450	<b>85132 M</b>	66,8
<b>200</b>	280	62	2	277	204	1	735	3146	700	<b>81240 M</b>	66,8
<b>210</b>	420	120	4	420	212	2	2380	11616	400	<b>85142 M</b>	95,6
	460	120	4	460	212	3	2500	12144	380	<b>85242 M</b>	117
<b>240</b>	540	125 <sup>2)</sup>	5	540	242	4	5308	34918	360	<b>85148 M</b>	248
<b>270</b>	520	125	5	520	274	3	8239	16840	360	<b>85154 M</b>	148
<b>272</b>	480	132	5	480	274	3	2681	13010	360	<b>85254 M</b>	122
<b>280</b>	520	145	6	520	284	3	3296	16005	340	<b>85156 M</b>	160
<b>340</b>	620	170	6	620	344	3	4258	20698	280	<b>85168 M</b>	265

1) Cage diameters: d<sub>c</sub>=82; D<sub>c</sub>=181,6

2) Available with compensator ring, h=55

**Cylindrical roller thrust bearings, single direction**  
**Non-standardized**

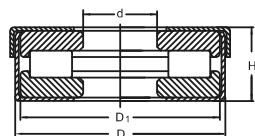


fig. 5

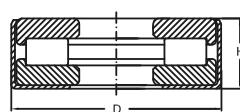


fig. 6



fig. 7

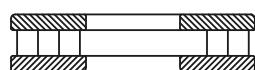


Fig. 8



fig. 9



fig. 10

d	D	H	Dimensions		Fig.	Basic axial load dyn stat. $C_a$ $C_{0a}$	Speed limit grease oil min <sup>-1</sup>	Designation Bearing	Mass kg
			$r_s$ min.	$r_{1S}$ min.					
mm									
<b>22,45</b>	48,02	15,9	0,3		6	38,5	87,1	2500	3200 <b>851Z04</b>
<b>25,8</b>	50,5	15,9	0,3		6	41	97	2400	3400 <b>861Z05</b>
<b>32</b>	61	17			55	5	27,3	72,6	3800 <b>851Z06</b>
	61	17			55	5	27,3	72,6	3800 <b>851Z06 TN</b>
<b>39</b>	73	20,5			69,5	6	67,7	190	2200 3200 <b>851Z08</b>
<b>44</b>	110	20	0,5	105	50	10	141	591	2300 3300 <b>86108 M</b>
<b>50,952</b>	74,74	15,875	0,6			6	52,2	155	2400 3600 <b>851Z10</b>
<b>70</b>	95	6	0,3		95	72	7	46	234 4900 7000 <b>890614 M</b>
<b>85</b>	110	6	0,3		110	87	7	50	273 4900 7000 <b>890717 M</b>

**Cylindrical roller thrust bearings, double direction**  
Non-standardized

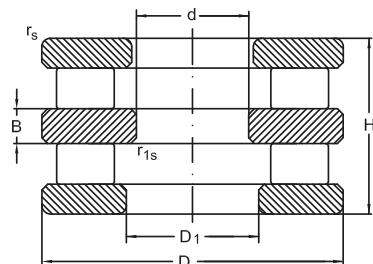


fig. 1

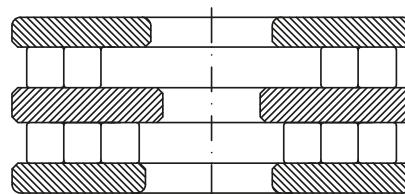
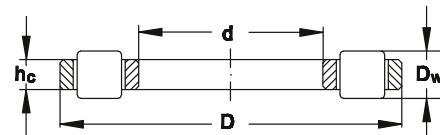


fig. 2

d	D	H	B	Dimensions		<b>Fig.</b>	Basic axial load dyn C <sub>a</sub>	Speed limit stat. C <sub>0a</sub>	Designation Bearing	Mass		
				r <sub>s</sub> min.	r <sub>1s</sub> min.							
mm												
<b>35</b>	71,85	33	8	1	1	62	1	44	118	2800	4000 <b>86107</b>	0,535
<b>85</b>	230	100	29	1,5	1,5	113	2	626	3086	700	1000 <b>86117 M</b>	21,82
<b>140</b>	200	72	19	1	1	154	1	253	1061	900	1300 <b>86228 M</b>	6,87
<b>141</b>	200	68	24	1	1	162,4	-	192	878	900	1300 <b>86128 M</b>	6,392
<b>150</b>	215	78	20	0,6	0,6	166	-	287	1217	900	1300 <b>86130 M</b>	8,82
<b>210</b>	400	262,7	95	3	3	242	-	2390	7770	430	630 <b>86142 M</b>	157

## Cylindrical roller and cage thrust assemblies



**fig. 3**



**fig. 4**

Dimensions				<b>Fig.</b>	Basic load dyn $C_a$	axial stat. $C_{0a}$	Speed limit		<b>Designation</b> Bearing	<b>Mass</b> kg
d	D	$D_w$	$h_c$				grease	oil		
mm										
<b>30,04</b>	60	5,5	3,75	4	51,3	176	4000	5600	<b>K89306 M</b>	0,066
<b>35,05</b>	68	6	4,2	4	59	214	3100	4400	<b>K89307 M</b>	0,096
<b>40,05</b>	81	7	5	4	88,6	333	3000	4300	<b>K85108 TN</b>	0,084
<b>60,06</b>	85	7,5	5,2	3	71,7	257	2800	4000	<b>K81112 M</b>	0,129
<b>65,06</b>	90	7,5	5,2	3	72,8	268	2600	3800	<b>K81113 M</b>	0,134
<b>70,05</b>	100	11	7,5	3	127	432	2200	3000	<b>K81214 M</b>	0,319
<b>75</b>	169	19	15,5	4	480	1806	1300	1800	<b>K891215 M</b>	2,35
<b>75,06</b>	100	7,5	5,75	3	68,7	268	2000	2800	<b>K81115 M</b>	0,146
<b>85</b>	179	19	15,5	4	501	1956	1200	1700	<b>K891117 M</b>	2,54
<b>90,06</b>	120	9	6,5	3	106	416	1500	2200	<b>K8111S M</b>	0,209



559

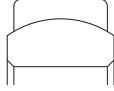
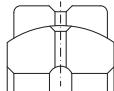
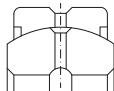
URB

# Spherical plain bearings

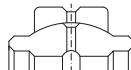
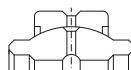
## Rod ends

Spherical plain bearings and rod ends URB are manufactured with material of the best quality on machines of high precision, therefore we are able to guarantee that they are products of high quality, suitable to a many lot of uses in sector of industry, farming, hydraulics, pneumatics and everywhere

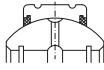
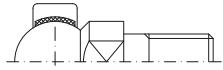
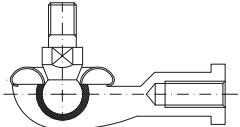
it is requested a precision use, or hard loads, or maintenance free. The tolerances of manufacture and assembly respect the rules of standard ISO (and DIN for some series used for hydraulics) and they are interchangeable with products of the most important manufacturers.

Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Spherical plain radial bearings with fitting crack GE...E GEG...E	page 566	GE...E GE...FO	GE...DO GE...G	4-12 4-12	Outer ring without single split in axial direction. No lubrication grooves and holes, both outer and inner rings are properly phosphorlylate-treated
 Spherical plain radial bearings with fitting crack GE...ES GEG...ES	page 568	GE...ES GEH...ES	GE...DO GE...FO	15-3000 15-280	Outer ring with single split in axial direction. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlylate-treated
 Spherical plain radial bearings with two seals and fitting crack GE...ES 2RS GEG...ES 2RS	page 569	GE...ES 2RS GEH...ES 2RS	GE...DO 2RS GE...FO 2RS	15-300 15-280	Outer ring with single split in axial direction. With two seals. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlylate-treated

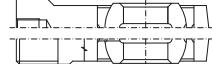
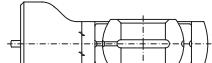
(Continued)

Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Spherical plain radial bearings with wide inner ring and fitting crack. GEEW...ES	page 570	GEG...ES	GE...LO	-	12-100 Outer ring with single split in axial direction. Inner ring with cylindrical extension at either side. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlylate-treated.
 Spherical plain radial bearings with two seals and wide inner ring and fitting crack GEEW...ES 2RS GEEM...ES 2RS	page 571	GEM...ES 2RS	GE...HO 2RS	-	20-80 12-100 Outer ring with single split in axial direction. With two seals. Inner ring with cylindrical extension at either side. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlylate-treated
 Maintenance-free spherical plain radial bearings GE...E GE...ET 2RS GEG...C GEG...ET 2RS	page 572	GE...C GE...TE 2RS GEH...C GEH...C 2RS	GE...UK GE...UK 2RS GE...FW GE...FW 2RS	GE...EC GE...EL 2RS	4-30 20-140 4-30 30-140 Outer ring pressed around inner ring. To line SF1 material on the surface of spherical plain. Spherical surface of inner ring with chromium plating.
 Angular contact spherical plain bearings GAC...S	page 575	GAC...F	GE...SW	-	25-120 Separable outer and inner rings. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlyate-treated.
 Spherical plain thrust bearings GX...S	page 576	GX...F	GE...AW	-	10-120 Separable shaft and housing washers. Lubrication grooves and holes in the housing washer. Both shaft and housing washer are properly phosphorlyate-treated.

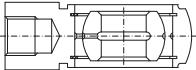
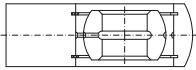
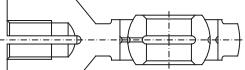
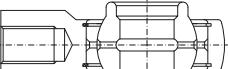
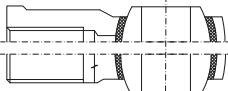
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Name and number	Equivalent			Bore diameter range (mm)	Design feature	
	SKF	INA	IKO			
 Spherical plain radial bearings with fitting crack. Dimensions in inches. GEZ...ES GEZ...ES 2RS	page 577	GEZ...ES GEZ...ES 2RS	GE...ZO GE...ZO 2RS	SBB... SBB...2RS	12,7-152,4 12,7-152,4	As type GE...ES, but dimensions in inches.
 Spherical plain radial bearings with two pieces. GE...XS K	page 579	-	-	SB...	12-150	Outer ring with two pieces in axial direction. Lubrication grooves and holes in the outer and inner rings. Both outer and inner rings are properly phosphorlylate-treated
 Spherical plain radial bearings with two seals, two pieces. GEK...XS 2RS	page 581	-	-	-	25-60	Outer ring with two axial pieces and two seals. Spherical surface of inner ring with chromium plating. Lubrication grooves and holes in the outer and inner rings.
 Ball joint rod ends with one shank. SQD...C	page 582	-	-	-	5-16	Ball joint housing is an outer ring of spherical plain radial bearing. To line SF1 material on the surface of spherical plain.
 Winding shape ball joint rod ends with a dust cover. SQ...C RS	page 583	-	-	-	5-22	Ball joint housing is a "L" shaped shank with dust cover with female tread. They are available for right or left hand thread. To line SF1 material on the surface of spherical plain.

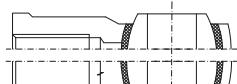
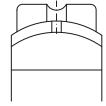
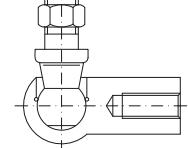
(Continued)

Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Straight ball joint rod ends with a dust cover. <u>SQZ...C RS</u>	page 585	-	-	-	5-22 Ball joint housing is an axial shank with dust cover with female thread. Stretching rod with right or left hand thread. To line SF1 material on the surface of spherical plain.
 Combination rod ends <u>SI...E</u> <u>SA...E</u>	pages 587, 592	SI...E SA...E	GIR...DO GAR...DO	-	5-12 5-12 Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. It is made up of a spherical plain radial bearing of type GE...E and rod body.
 Combination rod ends <u>SI...ES</u> <u>SA...ES</u> <u>SI...ES 2RS</u> <u>SA...ES 2RS</u>	pages 587, 592	SI...ES/SIA...ES SA...ES/SIA...ES	GIR...DO GAR...DO GIR...DO 2RS GAR...DO 2RS	-	15-80 15-80 15-80 15-80 Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. It is made up of a spherical plain radial bearing of type GE...ES and rod body. The housing with a lubrication hole or a grease nipple.
 Combination rod ends <u>SI...C</u> <u>SA...C</u> <u>SI...C 2RS</u> <u>SA...C 2RS</u>	pages 587, 592	SI...C SA...C SI...TE 2RS SA...TE 2RS	GIR...UK GAR...UK GIR...UK 2RS GAR...UK 2RS	-	15-80 15-80 35-80 35-80 Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. It is made up of a spherical plain radial bearing of type GE...ES and rod body. To line SF1 material on the surface of spherical plain.
 Ball joint ends for hydraulics with grease nipple, welding steel body <u>TAC</u>	page 593		GK...DO	-	10-18 Round ball joint ends to weld on the bottom of cylinder. Standard dimensions DIN 648. Sliding contact surface: steel/steel

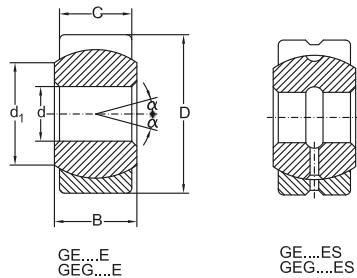
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Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 Screwed ball joint ends for hydraulics also with screw clamping device and grease nipple <u>TAPR...N</u>	page 594	SIR...ES	GIHR...DO GIHRK...DO	- -	20-120 20-120 Screwed ball joint ends with screw on shank and also with body equipped of clamping screws in hard execution. Sliding contact surface: steel/steel
 Ball joint ends for hydraulics with grease nipple, welding <u>steel body</u> <u>TPN</u>	page 596	SCF...ES	GF...DO	-	2020 Ball joint ends in strong execution to weld advisable with alternate loads. Sliding contact surface: steel/steel
 Screw on ball joint ends for hydraulics with screw clamping device and grease nipple <u>TAPR...DO</u>	page 597	SIJ...ES	GIHO-K...DO	-	12-100 Ball joint ends with internal thread and clamping device through two screws on two sides Standard DIN 24555. Sliding contact surface: steel/steel
 Screw on ball joint ends for hydraulics with screw clamping device and grease nipple <u>TAPR...CE</u>	page 598	SIQG...ES	GIHN-K...LO	-	12-125 Stout ball joint ends with internal thread. Standard DIN 24338 with screws clamping device sliding contact surface: steel/steel
 Rod ends <u>POS...</u> <u>PHS...</u>	pages 599, 600	SAKAC...M SIKAC...M	GAKFR...PB GIKFR...PB	POS... PHS...	5-30 5-30 Bearings with a stretching rod. Stretching rod with right or left-hand, male or female thread. To line bronze material on the surface of spherical plain. Spherical surface of ball with chromium plating.

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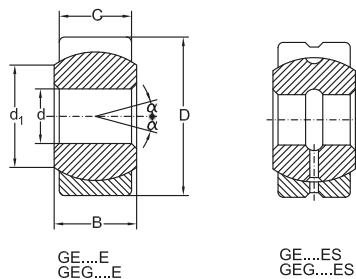
Name and number	Equivalent			Bore diameter range (mm)	Design feature
	SKF	INA	IKO		
 page 600	SAKBF...F SIKB...F	GAKFR...PW GIKFR...PW	POS...EC PHS...EC	5-30 5-30	Bearings with a stretching rod with right or left-hand, male or female thread. To line SF1 material on the surface of spherical plain. Spherical surface of ball with chromium plating.
 page 601	-	-	-	5-30	Outer ring with single split in axial direction. Lubrication grooves and holes in the outer rings. Sliding contact surfaces: bronze/steel.
 page 602	-	-	-	8-19	Ball joints rod ends with shank and spring clamping.
 Ball joints rod ends DIN 71802					

**Spherical plain radial bearings with fitting crack**  
**Two seals and fitting crack, fitting groove**  
 ISO 6124-1979, ISO 6125-1979



Dimensions					Load ratings			Designation	Mass
d	D	B	C	d <sub>1</sub> min	dyn.	stat.	α*	-	kg
mm					kN	kN			
<b>4</b>	12	5	3	6	2	10	16	<b>GE4 E</b>	0,0033
<b>5</b>	14	6	4	7	3,4	17	13	<b>GE5 S</b>	0,0038
<b>6</b>	14	6	4	8	3,4	17	13	<b>GE6 S</b>	0,0042
<b>8</b>	16	8	5	10	5,5	27	15	<b>GE8 S</b>	0,0075
<b>10</b>	19	9	6	13	8,1	40	12	<b>GE10 E</b>	0,011
<b>12</b>	22	10	7	15	10	54	10	<b>GE12 E</b>	0,015
<b>15</b>	26	12	9	18	17	85	8	<b>GE15 E</b>	0,027
	26	12	9	18	17	85	8	<b>GE15 ES-2RS</b>	0,027
<b>17</b>	30	14	10	20	21	106	10	<b>GE17 ES</b>	0,041
	30	14	10	20	21	106	10	<b>GE17 ES-RS</b>	0,041
<b>20</b>	35	16	12	24	30	146	9	<b>GE20 ES</b>	0,066
	35	16	12	24	30	146	9	<b>GE20 ES-2RS</b>	0,066
<b>25</b>	42	20	16	29	48	240	7	<b>GE25 ES</b>	0,119
	42	20	16	29	48	240	7	<b>GE25 ES-2RS</b>	0,119
<b>30</b>	47	22	18	34	62	310	6	<b>GE30 ES</b>	0,153
	47	22	18	34	62	310	6	<b>GE30 ES-2RS</b>	0,153
<b>35</b>	55	25	20	39	80	400	6	<b>GE35 ES</b>	0,233
	55	25	20	39	80	400	6	<b>GE35 ES-2RS</b>	0,233
<b>40</b>	62	28	22	45	100	500	7	<b>GE40 ES</b>	0,306
	62	28	22	45	100	500	7	<b>GE40 ES-2RS</b>	0,306
<b>45</b>	68	32	25	50	127	640	7	<b>GE45 ES</b>	0,427
	68	32	25	50	127	640	7	<b>GE45 ES-2RS</b>	0,427
<b>50</b>	75	35	28	55	156	780	6	<b>GE50 ES</b>	0,546
	75	35	28	55	156	780	6	<b>GE50 ES-2RS</b>	0,546
<b>60</b>	90	44	36	66	245	1220	6	<b>GE60 ES</b>	1,045
	90	44	36	66	245	1220	6	<b>GE60 ES-2RS</b>	1,045
<b>70</b>	105	49	40	77	315	1560	6	<b>GE70 ES</b>	1,55
	105	49	40	77	315	1560	6	<b>GE70 ES-2RS</b>	1,55
<b>80</b>	120	55	45	88	400	2000	6	<b>GE80 ES</b>	2,31
	120	55	45	88	400	2000	6	<b>GE80 ES-2RS</b>	2,31
<b>90</b>	130	60	50	98	490	2450	5	<b>GE90 ES</b>	2,75

**Spherical plain radial bearings with fitting crack**  
**Two seals and fitting crack, fitting groove**  
 ISO 6124-1979, ISO 6125-1979



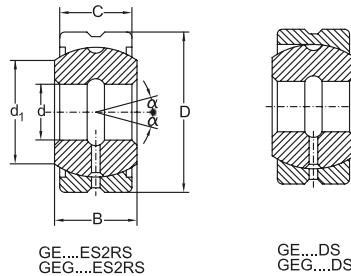
Dimensions					Load ratings			Designation	Mass
d	D	B	C	d <sub>1</sub> min	dyn.	stat.	α*	-	kg
mm					kN	kN			
<b>90</b>	130	60	50	98	490	2450	5	<b>GE90 ES-2RS</b>	2,75
<b>100</b>	150	70	55	109	610	3050	7	<b>GE100 ES</b>	4,45
	150	70	55	109	610	3050	7	<b>GE100 ES-2RS</b>	4,45
<b>110</b>	160	70	55	120	655	3250	6	<b>GE110 ES</b>	4,82
	160	70	55	120	655	3250	6	<b>GE110 ES-2RS</b>	4,82
<b>120</b>	180	85	70	130	950	4750	6	<b>GE120 ES</b>	8,05
	180	85	70	130	950	4750	6	<b>GE120 ES-2RS</b>	8,05
<b>140</b>	210	90	70	150	1080	5400	7	<b>GE140 ES</b>	11,02
	210	90	70	150	1080	5400	7	<b>GE140 ES-2RS</b>	11,02
<b>160</b>	230	105	80	170	1370	6800	8	<b>GE160 ES</b>	14,01
	230	105	80	170	1370	6800	8	<b>GE160 ES-2RS</b>	14,01
<b>180</b>	260	105	80	192	1530	7650	6	<b>GE180 ES</b>	18,65
	260	105	80	192	1530	7650	6	<b>GE180 ES-2RS</b>	18,65
	260	105	80	192	1530	7650	6	<b>GE180 DS</b>	18,65
<b>200</b>	290	130	100	212	2120	10600	7	<b>GE200 ES</b>	28,03
	290	130	100	212	2120	10600	7	<b>GE200 ES-2RS</b>	28,03
	290	130	100	212	2120	10600	7	<b>GE200 DS</b>	28,03
<b>220</b>	320	135	100	238	2320	11600	8	<b>GE220 ES</b>	35,91
	320	135	100	238	2320	11600	8	<b>GE220 ES-2RS</b>	35,91
	320	135	100	238	2320	11600	8	<b>GE220 DS</b>	35,91
<b>240</b>	340	140	100	265	2550	12700	8	<b>GE240 ES</b>	39,91
	340	140	100	265	2550	12700	8	<b>GE240 ES-2RS</b>	39,91
	340	140	100	265	2550	12700	8	<b>GE240 DS</b>	39,91
<b>260</b>	370	150	110	285	3050	15300	7	<b>GE260 ES</b>	51,84
	370	150	110	285	3050	15300	7	<b>GE260 ES-2RS</b>	51,84
	370	150	110	285	3050	15300	7	<b>GE260 DS</b>	51,84
<b>280</b>	400	155	120	310	3550	18000	6	<b>GE280 ES</b>	65,36
	400	155	120	310	3550	18000	6	<b>GE280 ES-2RS</b>	65,36
	400	155	120	310	3550	18000	6	<b>GE280 DS</b>	65,36
<b>300</b>	430	165	120	330	3800	19000	7	<b>GE300 ES</b>	78,07
	430	165	120	330	3800	19000	7	<b>GE300 ES-2RS</b>	78,07
	430	165	120	330	3800	19000	7	<b>GE300 DS</b>	78,07

\*The sizes are not binding.

## Spherical plain radial bearings with fitting crack

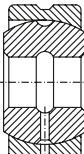
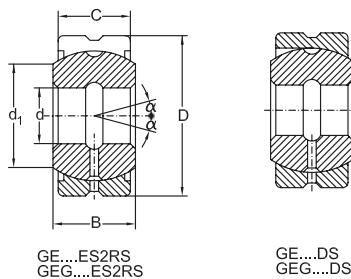
### Two seals and fitting crack, fitting groove

ISO 6124-1979, ISO 6125-1979



Dimensions d mm	D	B	C	d <sub>1</sub> min	Load ratings			Designation	Mass kg
					dyn.	stat.	a*		
<b>4</b>	14	7	4	7	3,4	17	20	<b>GEG4 E</b>	0,0045
<b>5</b>	16	9	5	8	5,5	27	21	<b>GEG5 S</b>	0,0066
<b>6</b>	16	9	5	9	5,5	27	21	<b>GEG6 S</b>	0,0081
<b>8</b>	19	11	6	11	8,1	40	21	<b>GEG8 E</b>	0,014
<b>10</b>	22	12	7	13	10	54	18	<b>GEG10 E</b>	0,021
<b>12</b>	26	15	9	16	17	85	18	<b>GEG12 E</b>	0,033
<b>15</b>	30	16	10	19	21	106	16	<b>GEG15 E</b>	0,049
	30	16	10	19	21	106	16	<b>GEG15 ES-2RS</b>	0,049
<b>17</b>	35	20	12	21	30	146	19	<b>GEG17 ES</b>	0,083
	35	20	12	21	30	146	19	<b>GEG17 ES-2RS</b>	0,083
<b>20</b>	42	25	16	24	48	240	17	<b>GEG20 ES</b>	0,153
	42	25	16	24	48	240	17	<b>GEG20 ES-2RS</b>	0,153
<b>25</b>	47	28	18	29	62	310	17	<b>GEG25 ES</b>	0,203
	47	28	18	29	62	310	17	<b>GEG25 ES-2RS</b>	0,203
<b>30</b>	55	32	20	34	80	400	17	<b>GEG30 ES</b>	0,304
	55	32	20	34	80	400	17	<b>GEG30 ES-2RS</b>	0,304
<b>35</b>	62	35	22	39	100	500	16	<b>GEG35 ES</b>	0,408
	62	35	22	39	100	500	16	<b>GEG35 ES-2RS</b>	0,408
<b>40</b>	68	40	25	44	127	640	17	<b>GEG40 ES</b>	0,542
	68	40	25	44	127	640	17	<b>GEG40 ES-2RS</b>	0,542
<b>45</b>	75	43	28	50	156	780	15	<b>GEG45 ES</b>	0,713
	75	43	28	50	156	780	15	<b>GEG45 ES-2RS</b>	0,713
<b>50</b>	90	56	36	57	245	1220	17	<b>GEG50 ES</b>	1,44
	90	56	36	57	245	1220	17	<b>GEG50 ES-2RS</b>	1,44
<b>60</b>	105	63	40	67	315	1560	17	<b>GEG60 ES</b>	1,60
	105	63	40	67	315	1560	17	<b>GEG60 ES-2RS</b>	1,60
<b>70</b>	120	70	45	77	400	2000	16	<b>GEG70 ES</b>	3,01
	120	70	45	77	400	2000	16	<b>GEG70 ES-2RS</b>	3,01
<b>80</b>	130	75	50	87	490	2450	14	<b>GEG80 ES</b>	3,64
	130	75	50	87	490	2450	14	<b>GEG80 ES-2RS</b>	3,64

**Spherical plain radial bearings with fitting crack**  
**Two seals and fitting crack, fitting groove**  
**ISO 6124-1979, ISO 6125-1979**



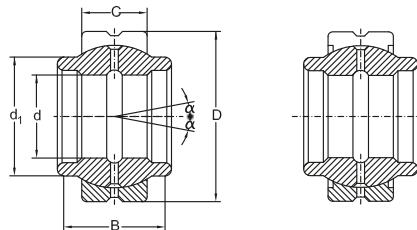
Dimensions d	D	B	C	d <sub>1</sub> min	Load ratings			Designation	Mass kg
					dyn.	stat.	a*		
<b>90</b>	150	85	55	98	610	3050	15	<b>GEG90 ES</b>	5,22
	150	85	55	98	610	3050	15	<b>GEG90 ES-2RS</b>	5,22
<b>100</b>	160	85	55	110	655	3250	14	<b>GEG100 ES</b>	6,05
	160	85	55	110	655	3250	14	<b>GEG100 ES-2RS</b>	6,05
<b>110</b>	180	100	70	122	950	4750	12	<b>GEG110 ES</b>	9,68
	180	100	70	122	950	4750	12	<b>GEG110 ES-2RS</b>	9,68
<b>120</b>	210	115	70	132	1080	5400	16	<b>GEG120 ES</b>	14,72
	210	115	70	132	1080	5400	16	<b>GEG120 ES-2RS</b>	14,72
<b>140</b>	230	130	80	151	1370	6800	16	<b>GEG140 ES</b>	19,01
	230	130	80	151	1370	6800	16	<b>GEG140 ES-2RS</b>	19,01
<b>160</b>	260	135	80	176	1530	7650	16	<b>GEG160 ES</b>	20,02
	260	135	80	176	1530	7650	16	<b>GEG160 ES-2RS</b>	20,02
	260	135	80	176	1530	7650	16	<b>GEG160 DS</b>	20,02
<b>180</b>	290	155	100	196	2120	10600	14	<b>GEG180 ES</b>	32,21
	290	155	100	196	2120	10600	14	<b>GEG180 ES-2RS</b>	32,21
	290	155	100	196	2120	10600	14	<b>GEG180 DS</b>	32,21
<b>200</b>	320	165	100	220	2320	11600	15	<b>GEG200 ES</b>	45,28
	320	165	100	220	2320	11600	15	<b>GEG200 ES-2RS</b>	45,28
	320	165	100	220	2320	11600	15	<b>GEG200 DS</b>	45,28
<b>220</b>	340	175	100	243	2550	12700	16	<b>GEG220 ES</b>	51,12
	340	175	100	243	2550	12700	16	<b>GEG220 ES-2RS</b>	51,12
	340	175	100	243	2550	12700	16	<b>GEG220 DS</b>	51,12
<b>240</b>	370	190	110	263	3050	15300	15	<b>GEG240 ES</b>	65,12
	370	190	110	263	3050	15300	15	<b>GEG240 ES-2RS</b>	65,12
	370	190	110	263	3050	15300	15	<b>GEG240 DS</b>	65,12
<b>260</b>	400	205	120	285	3550	18000	15	<b>GEG260 ES</b>	82,44
	400	205	120	285	3550	18000	15	<b>GEG260 ES-2RS</b>	82,44
	400	205	120	285	3550	18000	15	<b>GEG260 DS</b>	82,44
<b>280</b>	430	210	120	310	3800	19000	15	<b>GEG280 ES</b>	97,21
	430	210	120	310	3800	19000	15	<b>GEG280 ES-2RS</b>	97,21
	430	210	120	310	3800	19000	15	<b>GEG280 DS</b>	97,21

\*The sizes are not binding.

**Spherical plain radial bearings with wide inner ring  
and fitting crack**

**Two seals and wide inner ring and fitting crack**

ISO 61204/2-1982



GEEW....ES

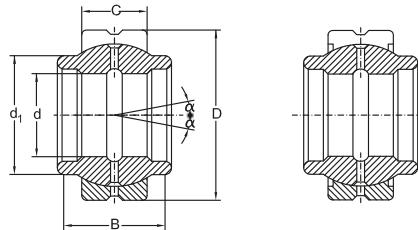
GEEW....ES2RS  
GEEM....ES2RS

Dimensions d mm	D	B	C	d <sub>1</sub> min	Load ratings			Designation	Mass kg
					dyn.	stat.	a*		
<b>12</b>	22	12	7	15,5	10	54	4	GEEW12 ES	0,022
	22	12	7	15,5	10	54	4	GEEW12 ES-2RS*	0,022
<b>15</b>	26	15	9	18,5	17	85	5	GEEW15 ES	0,031
	26	15	9	18,5	17	85	5	GEEW15 ES-2RS	0,031
<b>16</b>	28	16	9	20	17	85	4	GEEW16 ES	0,035
	28	16	9	20	17	85	4	GEEW16 ES-2RS	0,035
<b>17</b>	30	17	10	21	21	106	7	GEEW17 ES	0,044
	30	17	10	21	21	106	7	GEEW17 ES-2RS	0,044
<b>20</b>	35	20	12	25	30	146	4	GEEW20 ES	0,071
	35	20	12	25	30	146	4	GEEW20 ES-2RS	0,071
<b>25</b>	42	25	16	30,5	48	240	4	GEEW25 ES	0,131
	42	25	16	30,5	48	240	4	GEEW25 ES-2RS	0,131
<b>30</b>	47	30	18	34	62	310	4	GEEW30 ES	0,168
	47	30	18	34	62	310	4	GEEW30 ES-2RS	0,168
<b>32</b>	52	32	18	37	62	310	4	GEEW32 ES	0,182
	52	32	18	37	62	310	4	GEEW32 ES-2RS	0,182
<b>35</b>	55	35	20	40	80	400	4	GEEW35 ES	0,253
	55	35	20	40	80	400	4	GEEW35 ES-2RS	0,253
<b>40</b>	62	40	22	46	100	500	4	GEEW40 ES	0,338
	62	40	22	46	100	500	4	GEEW40 ES-2RS	0,338
<b>45</b>	68	45	25	52	127	640	4	GEEW45 ES	0,481
	68	45	25	52	127	640	4	GEEW45 ES-2RS	0,481
<b>50</b>	75	50	28	57	156	780	4	GEEW50 ES	0,558
	75	50	28	57	156	780	4	GEEW50 ES-2RS	0,558
<b>60</b>	90	60	36	68	245	1220	3	GEEW60 ES	1,15
	90	60	36	68	245	1220	3	GEEW60 ES-2RS	1,15
<b>63</b>	95	63	36	71,5	245	1220	4	GEEW63 ES	1,23
	95	63	36	71,5	245	1220	4	GEEW63 ES-2RS	1,23
<b>70</b>	105	70	40	78	315	1560	4	GEEW70 ES	1,71
	105	70	40	78	315	1560	4	GEEW70 ES-2RS	1,71

## Spherical plain radial bearings with wide inner ring and fitting crack

### Two seals and wide inner ring and fitting crack

ISO 61204/2-1982



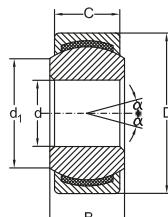
GEEW...ES

GEEW...ES2RS  
GEEM...ES2RS

Dimensions	d	D	B	C	d <sub>1</sub> min	Load ratings		Designation	Mass
						dyn.	stat.		
mm									
						kN	kN		
<b>80</b>	120	80	45	91	400	2000	4	<b>GEEW80 ES</b>	2,39
	120	80	45	91	400	2000	4	<b>GEEW80 ES-2RS</b>	2,39
<b>100</b>	150	100	55	113	610	3050	4	<b>GEEW100 ES</b>	4,80
	150	100	55	113	610	3050	4	<b>GEEW100 ES-2RS</b>	4,80
<b>125</b>	180	125	70	138	950	4750	4	<b>GEEW125 ES</b>	8,50
	180	125	70	138	950	4750	4	<b>GEEW125 ES-2RS</b>	8,50
<b>20</b>	35	24	12	24	30	146	6	<b>GEEM20 ES-2RS</b>	0,073
<b>25</b>	42	29	16	29	48	240	4	<b>GEEM25 ES-2RS</b>	0,13
<b>30</b>	47	30	18	34	62	310	4	<b>GEEM30 ES-2RS</b>	0,17
<b>35</b>	55	35	20	40	80	400	4	<b>GEEM35 ES-2RS</b>	0,25
<b>40</b>	62	38	22	45	100	500	4	<b>GEEM40 ES-2RS</b>	0,35
<b>45</b>	68	40	25	52	127	640	4	<b>GEEM45 ES-2RS</b>	0,49
<b>50</b>	75	43	28	57	156	780	4	<b>GEEM50 ES-2RS</b>	0,60
<b>60</b>	90	54	36	68	245	1220	3	<b>GEEM60 ES-2RS</b>	1,15
<b>70</b>	105	65	40	78	315	1560	4	<b>GEEM70 ES-2RS</b>	1,65
<b>80</b>	120	74	45	90	400	2000	4	<b>GEEM80 ES-2RS</b>	2,50

\*The sizes are not binding.

**Maintenance free spherical plain radial bearings**  
**GB304.7-81, GB304.9-81 (ISO6124-1979, ISO6125-1979)**

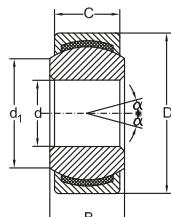


GE...C  
GE...ET2RS

Dimensions	d	D	B	C	d <sub>1</sub> min	Load ratings		α*	Designation	Mass
						dyn.	stat.			
mm										
						kN	kN	-		kg
<b>4</b>	12	5	3	6	6	2,1	5,4	16	<b>GE4 C</b>	0,0033
<b>5</b>	14	6	4	7	7	3,6	9,1	13	<b>GE5 C</b>	0,0038
<b>6</b>	14	6	4	8	8	3,6	9,1	13	<b>GE6 C</b>	0,0042
<b>8</b>	16	8	5	10	10	5,8	14	15	<b>GE8 C</b>	0,0075
<b>10</b>	19	9	6	13	13	8,6	21	12	<b>GE10 C</b>	0,011
<b>12</b>	22	10	7	15	15	11	28	10	<b>GE12 C</b>	0,015
<b>15</b>	26	12	9	18	18	18	45	8	<b>GE15 C</b>	0,027
<b>17</b>	30	14	10	20	20	22	56	10	<b>GE17 C</b>	0,041
<b>20</b>	35	16	12	24	24	31	78	9	<b>GE20 C</b>	0,066
	35	16	12	24	24	31	78	9	<b>GE20 ET-2RS</b>	0,066
<b>25</b>	42	20	16	29	29	51	127	7	<b>GE25 C</b>	0,119
	42	20	16	29	29	51	127	7	<b>GE25 ET-2RS</b>	0,119
<b>30</b>	47	22	18	34	34	65	166	6	<b>GE30 C</b>	0,163
	47	22	18	34	34	65	166	6	<b>GE30 ET-2RS</b>	0,163
<b>35</b>	55	25	20	-	110	110	220	6	<b>GE35 ET-2RS</b>	0,25
<b>40</b>	62	28	22	-	140	140	280	6	<b>GE40 ET-2RS</b>	0,30
<b>45</b>	68	32	25	-	180	180	350	6	<b>GE45 ET-2RS</b>	0,35
<b>50</b>	75	35	28	-	220	220	430	6	<b>GE50 ET-2RS</b>	0,50
<b>60</b>	90	44	36	-	340	340	690	6	<b>GE60 ET-2RS</b>	1,00
<b>70</b>	105	49	40	-	430	430	870	6	<b>GE70 ET-2RS</b>	1,40
<b>80</b>	120	55	45	-	560	560	1140	6	<b>GE80 ET-2RS</b>	2,00
<b>90</b>	130	60	50	-	690	690	1350	6	<b>GE90 ET-2RS</b>	2,50

## Maintenance free spherical plain radial bearings

GB304.7-81, GB304.9-81 (ISO6124-1979, ISO6125-1979)

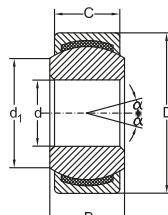


GE...C  
GE...ET2RS

Dimensions					Load ratings			Designation	Mass
d	D	B	C	d <sub>1</sub> min	dyn.	stat.	α*	-	kg
<b>mm</b>									
<b>100</b>	150	70	55	-	850	1700	6	<b>GE100 ET-2RS</b>	4,00
<b>110</b>	160	70	55	-	900	1850	6	<b>GE110 ET-2RS</b>	4,50
<b>120</b>	180	85	70	-	1300	2700	6	<b>GE120 ET-2RS</b>	7,20
<b>140</b>	210	90	70	-	1500	3000	6	<b>GE140 ET-2RS</b>	10,00

## Maintenance free spherical plain radial bearings

ISO6124-1979, ISO 6125-1979



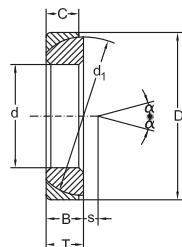
GE...C  
GE...ET2RS

Dimensions					Load ratings			Designation	Mass
d	D	B	C	d <sub>1</sub> min	dyn.	stat.	a*	-	kg
mm					kN	kN			
<b>4</b>	14	7	4	7	3,6	9,1	20	<b>GEG4 C</b>	0,0045
<b>5</b>	16	9	5	8	5,8	14	21	<b>GEG5 C</b>	0,0066
<b>6</b>	16	9	5	9	5,8	14	21	<b>GEG6 C</b>	0,0081
<b>8</b>	19	11	6	11	8,8	21	21	<b>GEG8 C</b>	0,014
<b>10</b>	22	12	7	13	11	28	18	<b>GEG10 C</b>	0,021
<b>12</b>	26	15	9	16	18	45	18	<b>GEG12 C</b>	0,033
<b>15</b>	30	16	10	19	22	56	16	<b>GEG15 C</b>	0,049
<b>17</b>	35	20	12	21	31	78	19	<b>GEG17 C</b>	0,083
<b>20</b>	42	25	16	24	51	127	17	<b>GEG20 C</b>	0,153
<b>25</b>	47	28	18	29	65	166	17	<b>GEG25 C</b>	0,203
<b>30</b>	55	32	20	34	83	212	17	<b>GEG30 C</b>	0,304
	55	32	20	-	110	220	17	<b>GEG30 ET-2RS</b>	0,30
<b>35</b>	62	35	22	-	140	270	17	<b>GEG35 ET-2RS</b>	0,35
<b>40</b>	68	40	25	-	180	350	15	<b>GEG40 ET-2RS</b>	0,50
<b>45</b>	75	43	28	-	220	430	15	<b>GEG45 ET-2RS</b>	0,60
<b>50</b>	90	56	36	-	340	680	15	<b>GEG50 ET-2RS</b>	1,40
<b>60</b>	105	63	40	-	430	850	15	<b>GEG60 ET-2RS</b>	2,00
<b>70</b>	120	70	45	-	550	1100	16	<b>GEG70 ET-2RS</b>	2,80
<b>80</b>	130	75	50	-	680	1350	14	<b>GEG80 ET-2RS</b>	3,40
<b>90</b>	150	85	55	-	850	1700	15	<b>GEG90 ET-2RS</b>	5,00
<b>100</b>	160	85	55	-	900	1800	14	<b>GEG100 ET-2RS</b>	5,50
<b>110</b>	180	100	70	-	1300	2700	12	<b>GEG110 ET-2RS</b>	9,00
<b>120</b>	210	115	70	-	1500	3000	15	<b>GEG120 ET-2RS</b>	14,50
<b>140</b>	230	130	80	-	1900	3500	15	<b>GEG140 ET-2RS</b>	18,20

\*The sizes are not binding.

ET/C - To line SF1 material on the surface of spherical plain.

## Angular contact spherical plain bearings

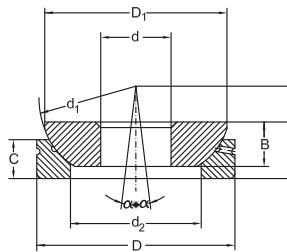


GAC....S

Dimensions d	D	B	C	T	d <sub>1</sub>	S	Load ratings			Designation	Mass kg
							dyn.	stat.	α*		
mm							kN	kN	-		
<b>25</b>	47	15	14	15	42	0,6	47,5	236	3,5	<b>GAC25 S</b>	0,148
<b>30</b>	55	17	15	17	49,5	1,3	63	315	3	<b>GAC30 S</b>	0,208
<b>35</b>	62	18	16	18	55,5	2,1	76,5	390	3	<b>GAC35 S</b>	0,268
<b>40</b>	68	19	17	19	62	2,8	90	450	3	<b>GAC40 S</b>	0,327
<b>45</b>	75	20	18	20	68,5	3,5	106	530	3	<b>GAC45 S</b>	0,416
<b>50</b>	80	20	19	20	74	4,3	118	585	3	<b>GAC50 S</b>	0,455
<b>60</b>	95	23	21	23	88,5	5,7	160	800	3	<b>GAC60 S</b>	0,714
<b>70</b>	110	25	23	25	102	7,2	208	1040	2,5	<b>GAC70 S</b>	1,04
<b>80</b>	125	29	25,5	29	115	8,6	250	1250	2,5	<b>GAC80 S</b>	1,54
<b>90</b>	140	32	28	32	128,5	10,1	320	1600	2,5	<b>GAC90 S</b>	2,09
<b>100</b>	150	32	31	32	141	11,6	345	1760	2	<b>GAC100 S</b>	2,34
<b>110</b>	170	38	34	38	155	13	475	2360	2	<b>GAC110 S</b>	3,68
<b>120</b>	180	38	37	38	168	14,5	510	2550	2	<b>GAC120 S</b>	3,97

\*The sizes are not binding.  
On request: sliding contact surface steel / PTFE, example GX...C.

## Spherical plain thrust bearing



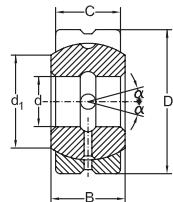
GX....S

Dimensions mm	d	D	H	B	C	d <sub>1</sub>	d <sub>2</sub>	D <sub>1</sub>	S	Load ratings			Designation	Mass kg
										dyn.	stat.	α*		
<b>10</b>	30	9,5	7,5	7	32	15,5	27,5	7	24	120	9	<b>GX10 S</b>	0,036	
<b>12</b>	35	13	9,5	9,3	38	18	32	8	32,5	163	8	<b>GX12 S</b>	0,072	
<b>15</b>	42	15	11	10,8	46	22,5	39	10	52	260	8	<b>GX15 S</b>	0,108	
<b>17</b>	47	16	11,8	11,2	52	27	43,5	11	58,5	300	10	<b>GX17 S</b>	0,137	
<b>20</b>	55	20	14,5	13,8	60	31	50	12,5	75	375	9	<b>GX20 S</b>	0,246	
<b>25</b>	62	22,5	16,5	16,7	68	34,5	58,5	14	129	640	7	<b>GX25 S</b>	0,415	
<b>30</b>	75	26	19	19	82	42	70	17,5	170	850	7	<b>GX30 S</b>	0,614	
<b>35</b>	90	28	22	20,7	98	50,5	84	22	260	1290	8	<b>GX35 S</b>	0,973	
<b>40</b>	105	32	27	21,5	114	59	97	24,5	375	1860	9	<b>GX40 S</b>	1,59	
<b>45</b>	120	36,5	31	25,5	128	67	110	27,5	490	2450	9	<b>GX45 S</b>	2,24	
<b>50</b>	130	42,5	33	30,5	139	70	120	30	655	3250	7	<b>GX50 S</b>	3,14	
<b>60</b>	150	45	37	34	160	84	140	35	735	3650	8	<b>GX60 S</b>	4,63	
<b>70</b>	160	50	42	36,5	176	94,5	153	35	800	4050	8	<b>GX70 S</b>	5,37	
<b>80</b>	180	50	43,5	38	197	107,5	172	42,5	1040	5200	8	<b>GX80 S</b>	6,91	
<b>100</b>	210	59	51	46	222	127	198	45	1200	6000	8	<b>GX100 S</b>	10,98	
<b>120</b>	230	64	53,5	50	250	145	220	52,5	1250	6200	6	<b>GX120 S</b>	13,97	

\*The sizes are not binding.

On request: sliding contact surface steel / PTFE, example GX...C.

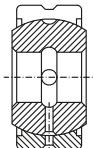
**Spherical plain radial bearings dimension in inches**  
**with fitting crack**  
**Two seals and fitting crack**



GEZ....ES

Dimensions	d	D	B	C	d <sub>1</sub> min	Load ratings		α*	Designation	Mass
						dyn.	stat.			
	mm					kN	kN	-		kg
<b>12,7</b>	22,225	11,1	9,525	14,1	13,7	41,5	6	<b>GEZ12 ES</b>	0,022	
<b>15,875</b>	26,988	13,894	11,913	18,3	22,0	65,5	6	<b>GEZ15 ES</b>	0,036	
<b>19,05</b>	31,75	16,662	14,275	21,8	31,5	95,0	6	<b>GEZ19 ES</b>	0,053	
<b>22,225</b>	36,513	19,431	16,662	25,4	4,25	127	6	<b>GEZ22 ES</b>	0,085	
<b>25,4</b>	41,275	22,225	19,05	27,6	56,0	166	6	<b>GEZ25 ES</b>	0,121	
	41,275	22,225	19,05	27,6	56,0	166	6	<b>GEZ25 ES-2RS</b>	0,121	
<b>31,75</b>	50,8	27,762	23,8	36,0	86,5	260	6	<b>GEZ31 ES</b>	0,232	
	50,8	27,762	23,8	36,0	86,5	260	6	<b>GEZ31 ES-2RS</b>	0,232	
<b>34,925</b>	55,563	30,15	26,187	38,6	102	310	6	<b>GEZ34 ES</b>	0,351	
	55,563	30,15	26,187	38,6	102	310	6	<b>GEZ34 ES-2RS</b>	0,351	
<b>38,1</b>	61,913	33,325	28,575	41,2	125	375	6	<b>GEZ38 ES</b>	0,422	
	61,913	33,325	28,575	41,2	125	375	6	<b>GEZ38 ES-2RS</b>	0,422	
<b>44,5</b>	71,438	38,887	33,325	50,7	170	510	6	<b>GEZ44 ES</b>	0,641	
	71,438	38,887	33,325	50,7	170	510	6	<b>GEZ44 ES-2RS</b>	0,641	
<b>50,8</b>	80,963	44,45	38,1	57,9	224	670	6	<b>GEZ50 ES</b>	0,932	
	80,963	44,45	38,1	57,9	224	670	6	<b>GEZ50 ES-2RS</b>	0,932	
<b>57,15</b>	90,488	50,013	42,85	64,9	280	850	6	<b>GEZ57 ES</b>	1,33	
	90,488	50,013	42,85	64,9	280	850	6	<b>GEZ57 ES-2RS</b>	1,33	
<b>63,5</b>	100,013	55,55	47,625	73,3	355	1060	6	<b>GEZ63 ES</b>	1,85	
	100,013	55,55	47,625	73,3	355	1060	6	<b>GEZ63 ES-2RS</b>	1,85	
<b>69,85</b>	111,125	61,112	52,375	79,1	415	1250	6	<b>GEZ69 ES</b>	2,42	
	111,125	61,112	52,375	79,1	415	1250	6	<b>GEZ69 ES-2RS</b>	2,42	
<b>76,2</b>	120,65	66,675	57,15	86,8	500	1500	6	<b>GEZ76 ES</b>	3,10	
	120,65	66,675	57,15	86,8	500	1500	6	<b>GEZ76 ES-2RS</b>	3,10	
<b>82,55</b>	130,175	72,238	61,9	94,5	585	1760	6	<b>GEZ82 ES</b>	3,82	
	130,175	72,238	61,9	94,5	585	1760	6	<b>GEZ82 ES-2RS</b>	3,82	
<b>88,9</b>	139,7	77,775	66,675	101,6	680	2040	6	<b>GEZ88 ES</b>	4,79	
	139,7	77,775	66,675	101,6	680	2040	6	<b>GEZ88 ES-2RS</b>	4,79	

**Spherical plain radial bearings dimension in inches**  
**with fitting crack**  
**Two seals and fitting crack**

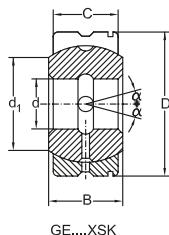


GEZ....ES2RS

Dimensions	d	D	B	C	d <sub>1</sub> min	Load ratings		Designation	Mass
						dyn.	stat.		
mm						kN	kN	-	kg
<b>95,25</b>	149,225	83,337	71,425	108,7	780	2360	6	<b>GEZ95 ES</b>	5,78
	149,225	83,337	71,425	108,7	780	2360	6	<b>GEZ95 ES-2RS</b>	5,78
<b>101,6</b>	158,75	88,9	76,2	115,8	900	2650	6	<b>GEZ101 ES</b>	6,99
	158,75	88,9	76,2	115,8	900	2650	6	<b>GEZ101 ES-2RS</b>	6,99
<b>107,95</b>	168,275	94,463	80,95	122,8	1000	3000	6	<b>GEZ107 ES</b>	8,41
	168,275	94,463	80,95	122,8	1000	3000	6	<b>GEZ107 ES-2RS</b>	8,41
<b>114,3</b>	177,8	100,013	85,725	130,6	1120	3400	6	<b>GEZ114 ES</b>	9,79
	177,8	100,013	85,725	130,6	1120	3400	6	<b>GEZ114 ES-2RS</b>	9,79
<b>120,65</b>	187,325	105,562	90,475	137,6	1250	3750	6	<b>GEZ120 ES</b>	11,5
	187,325	105,562	90,475	137,6	1250	3750	6	<b>GEZ120 ES-2RS</b>	11,5
<b>127</b>	196	111,125	95,25	145,3	1400	4150	6	<b>GEZ127 ES</b>	13,5
	196	111,125	95,25	145,3	1400	4150	6	<b>GEZ127 ES-2RS</b>	13,5
<b>152,4</b>	222,25	120,65	104,775	168,2	1730	5200	5	<b>GEZ152 ES</b>	17,5
	222,25	120,65	104,775	168,2	1730	5200	5	<b>GEZ152 ES-2RS</b>	17,5

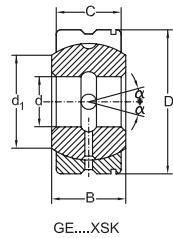
\*The sizes are not binding.

## Spherical plain radial bearings with two piece outer ring



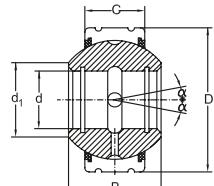
Dimensions	d	D	B	C	d <sub>1</sub> min	Load ratings		α*	Designation	Mass
						dyn.	stat.			
mm						kN	kN	-	kg	
<b>12</b>	22	11	9	14	12,9	39,2	7	<b>GE12 XS-K</b>	0,019	
<b>15</b>	26	13	11	17,5	19,5	57,8	6	<b>GE15 XS-K</b>	0,028	
<b>20</b>	32	16	14	23	31,3	94,8	4	<b>GE20 XS-K</b>	0,053	
<b>22</b>	37	19	16	25,5	40,3	122	6	<b>GE22 XS-K</b>	0,085	
<b>25</b>	42	21	18	29	51,1	155	5	<b>GE25 XS-K</b>	0,116	
<b>30</b>	50	27	23	36	81,2	248	6	<b>GE30 XS-K</b>	0,225	
<b>35</b>	55	30	26	40	103	314	5	<b>GE35 XS-K</b>	0,302	
<b>40</b>	62	33	28	44	122	370	6	<b>GE40 XS-K</b>	0,375	
<b>45</b>	72	36	31	50,5	152	461	5	<b>GE45 XS-K</b>	0,598	
<b>50</b>	80	42	36	58,5	225	622	5	<b>GE50 XS-K</b>	0,869	
<b>55</b>	90	47	40	64,5	253	768	6	<b>GE55 XS-K</b>	1,26	
<b>60</b>	100	53	45	72,5	321	980	6	<b>GE60 XS-K</b>	1,72	
<b>65</b>	105	55	47	76	350	1060	5	<b>GE65 XS-K</b>	2,05	
<b>70</b>	110	58	50	81,5	396	1220	5	<b>GE70 S-K</b>	2,23	
<b>75</b>	120	64	55	89,5	478	1450	5	<b>GE75 XS-K</b>	3,01	
<b>80</b>	130	70	60	97,5	571	1730	5	<b>GE80 XS-K</b>	3,98	
<b>85</b>	135	74	63	100,5	624	1890	6	<b>GE85 XS-K</b>	4,31	
<b>90</b>	140	76	65	105,5	670	2030	5	<b>GE90 XS-K</b>	4,72	
<b>95</b>	150	82	70	113,5	776	2350	5	<b>GE95 XS-K</b>	6,05	
<b>100</b>	160	88	75	121,5	891	2700	5	<b>GE100 XS-K</b>	7,43	

## Spherical plain radial bearings with two piece outer ring



Dimensions	d	D	B	C	Load ratings			Designation	Mass
					d <sub>1</sub> min	dyn.	stat.		
mm						kN	kN	-	kg
<b>110</b>	170	93	80	130	1010	1010	3070	<b>GE110 XS-K</b>	8,54
<b>115</b>	180	98	85	132,5	1110	1110	3370	<b>GE115 XS-K</b>	10,3
<b>120</b>	190	105	90	140	1250	1250	3780	<b>GE120 XS-K</b>	12,4
<b>130</b>	200	110	95	148,5	1390	1390	4220	<b>GE130 XS-K</b>	13,8
<b>150</b>	220	120	105	166	1710	1710	5170	<b>GE150 XS-K</b>	17,1

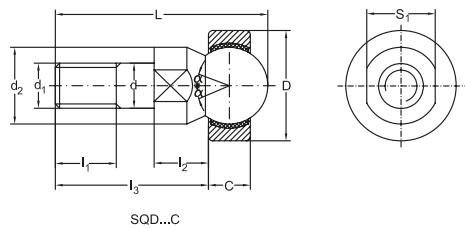
## Spherical plain radial bearings with two seals and two piece outer ring



GEK....XS2ES

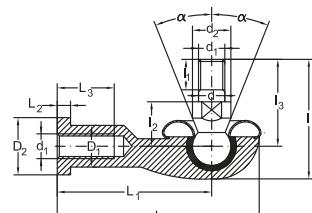
Dimensions	d	D	B	C	d <sub>1</sub> min	Load ratings		α*	Designation	Mass
						dyn.	stat.			
mm										
						kN	kN		-	kg
<b>25</b>	68	40	28	30	30	117	590	19	<b>GEK25 XS-2RS</b>	0,516
<b>30</b>	70	47	32	37,3	37,3	163	813	19	<b>GEK30 XS-2RS</b>	0,785
<b>35</b>	80	54	38	44,5	44,5	226	1130	17	<b>GEK35 XS-2RS</b>	1,23
<b>40</b>	90	64	44	48	48	298	1490	19	<b>GEK40 XS-2RS</b>	1,83
<b>45</b>	100	72	52	54	54	398	1990	17	<b>GEK45 XS-2RS</b>	2,56
<b>50</b>	110	80	58	60	60	493	2450	17	<b>GEK50 XS-2RS</b>	3,43
<b>55</b>	125	90	64	63,2	63,2	598	2990	19	<b>GEK55 XS-2RS</b>	5,02
<b>60</b>	135	98	72	69,3	69,3	732	3660	17	<b>GEK60 XS-2RS</b>	6,43

## Ball joint ends with one shank



Dimensions	d	d <sub>1</sub>	d <sub>2</sub> min	L <sub>max</sub>	l <sub>1</sub> min	l <sub>2</sub>	l <sub>3</sub> max	S <sub>1</sub>	C	D	Load ratings			Designation	Mass
											dyn.	stat.	a*		
mm													-	kg	
5	M5	9	27,5	8	8	19	7	6	16	2,4	6,2	25	SQD5 C	0,014	
6	M6	10	33,5	11	8,8	23,8	8	6,75	18	3,2	8,1	25	SQD6 C	0,021	
8	M8	12	41	12	11,6	28,6	10	9	22	5,5	14	25	SQD8 C	0,042	
10	M10x1,25	14	49	15	14,2	34,2	11	10,5	26	7,8	20	25	SQD10 C	0,067	
12	M12x1,25	19	55,1	17	15,1	38,1	16	12	30	10	27	25	SQD12 C	0,108	
14	M14x1,25	19	70,7	22	16,8	51,3	16	13,5	34	13	35	20	SQD14 C	0,167	
16	M16x1,25	22	76,3	23	18	54,5	18	15	38	17	45	20	SQD16 C	0,238	

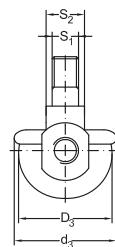
## Winding shape ball joint rod ends



SQ...C RS

Dimensions											
d	d <sub>1</sub>	d <sub>2</sub> min	d <sub>3</sub> max	l max	l <sub>1</sub> min	l <sub>2</sub>	l <sub>3</sub> max	s <sub>1</sub>	L max	L <sub>1</sub>	
mm											
<b>5</b>	M5	9	20	30	8	10	21	7	36	27	
	M5	9	20	30	8	10	21	7	36	27	
<b>6</b>	M6	10	20	36	11	11	26	8	40,5	30	
	M6	10	20	36	11	11	26	8	40,5	30	
<b>8</b>	M8	12	24	43,5	12	14	31	10	49	36	
	M8	12	24	43,5	12	14	31	10	49	36	
<b>10</b>	M10X1,25	14	30	51,5	15	17	37	11	58	43	
	M10X1,25	14	30	51,5	15	17	37	11	58	43	
<b>12</b>	M12X1,25	19	32	57,5	17	19	42	16	66	50	
	M12X1,25	19	32	57,5	17	19	42	16	66	50	
<b>14</b>	M14X1,25	19	38	73,5	22	21,5	56	16	75	57	
	M14X1,25	19	38	73,5	22	21,5	56	16	75	57	
<b>16</b>	M16X1,25	22	44	79,5	23	23,5	60	18	84	64	
	M16X1,25	22	44	79,5	23	23,5	60	18	84	64	
<b>18</b>	M18X1,25	25	45	90	25	26,5	68	21	93	71	
	M18X1,25	25	45	90	25	26,5	68	21	93	71	
<b>20</b>	M20X1,25	29	50	90	25	27	68	24	99	77	
	M20X1,25	29	50	90	25	27	68	24	99	77	
<b>22</b>	M22X1,25	29	52	95	26	28	70	24	109	84	
	M22X1,25	29	52	95	26	28	70	24	109	84	

## Winding shape ball joint rod ends



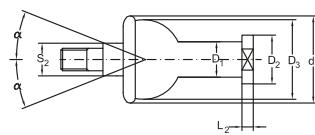
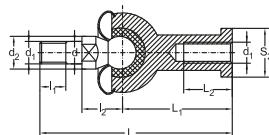
I <sub>2</sub> max	I <sub>3</sub> min	D <sub>1</sub> max	D <sub>2</sub> max	D <sub>3</sub> max	S <sub>2</sub>	Load ratings			Designation	Mass
						dyn.	stat.	α*		
						kN	kN	-	kg	
4	14	9	12	18	10	2,7	9,2	25	<b>SQ5 C</b>	0,025
4	14	9	12	18	10	2,7	9,2	25	<b>SQ5 C-RS</b>	0,025
5	14	10	13	20	10	3,6	12	25	<b>SQ6 C</b>	0,039
5	14	10	13	20	10	3,6	12	25	<b>SQ6 C-RS</b>	0,039
5	17	12,5	16	25	13	5,7	19	25	<b>SQ8 C</b>	0,068
5	17	12,5	16	25	13	5,7	19	25	<b>SQ8 C-RS</b>	0,068
6,5	21	15	19	29	16	8,2	27	25	<b>SQ10 C</b>	0,112
6,5	21	15	19	29	16	8,2	27	25	<b>SQ10 C-RS</b>	0,112
6,5	25	17,5	22	31	18	11	37	25	<b>SQ12 C</b>	0,164
6,5	25	17,5	22	31	18	11	37	25	<b>SQ12 C-RS</b>	0,164
8	26	20	25	35	21	14	48	25	<b>SQ14 C</b>	0,254
8	26	20	25	35	21	14	48	25	<b>SQ14 C-RS</b>	0,254
8	32	22	27	39	24	16	53	20	<b>SQ16 C</b>	0,336
8	32	22	27	39	24	16	53	20	<b>SQ16 C-RS</b>	0,336
10	34	25	31	44	27	18	61	20	<b>SQ18 C</b>	0,464
10	34	25	31	44	27	18	61	20	<b>SQ18 C-RS</b>	0,464
10	35	27,5	34	44	30	18	612	20	<b>SQ20 C</b>	0,538
10	35	27,5	34	44	30	18	612	20	<b>SQ20 C-RS</b>	0,538
12	41	30	37	50	30	22	75	16	<b>SQ22 C</b>	0,713
12	41	30	37	50	30	22	75	16	<b>SQ22 C-RS</b>	0,713

\*The sizes are not binding.

Available with thread M1,5 (SQ10 and SQ12) and M2 (SQ14 and SQ16)

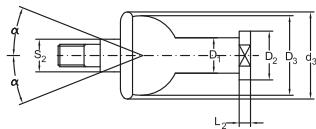
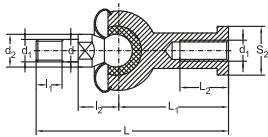
C - to line SF1 material on the surface of spherical plain. The shank of ball joint housing may be left - hand thread, for left - hand thread, suffix "L" is added to bearings number and thread sign, e. g. SQL6C, M6L - 6H.

## Straightball joint rod ends



SOZ...CRS

Dimensions											
d	d <sub>1</sub>	d <sub>2</sub> min	d <sub>3</sub> max	l <sub>1</sub> min	l <sub>2</sub>	S <sub>1</sub>	L max	L <sub>1</sub>	L <sub>2</sub> max	L <sub>3</sub> min	
mm											
<b>5</b>	M5	9	20	8	11	7	46	24	4	12	
	M5	9	20	8	11	7	46	24	4	12	
<b>6</b>	M6	10	20	11	12,2	8	55,2	28	5	15	
	M6	10	20	11	12,2	8	55,2	28	5	15	
<b>8</b>	M8	12	24	12	16	10	65	32	5	16	
	M8	12	24	12	16	10	65	32	5	16	
<b>10</b>	M10X1,25	14	30	15	19,5	11	74,5	35	6,5	18	
	M10X1,25	14	30	15	19,5	11	74,5	35	6,5	18	
<b>12</b>	M12X1,25	19	32	17	21	16	84	40	6,5	20	
	M12X1,25	19	32	17	21	16	84	40	6,5	20	
<b>14</b>	M14X1,25	19	38	22	23,5	16	104,5	45	8	25	
	M14X1,25	19	38	22	23,5	16	104,5	45	8	25	
<b>16</b>	M16X1,25	22	44	23	25,5	18	112	50	8	27	
	M16X1,25	22	44	23	25,5	18	112	50	8	27	
<b>18</b>	M18X1,25	25	45	25	31	21	130,5	58	10	32	
	M18X1,25	25	45	25	31	21	130,5	58	10	32	
<b>20</b>	M20X1,25	29	50	25	31	24	133	63	10	38	
	M20X1,25	29	50	25	31	24	133	63	10	38	
<b>22</b>	M22X1,25	29	52	26	33	24	145	70	12	43	
	M22X1,25	29	52	26	33	24	145	70	12	43	



SQZ...C RS

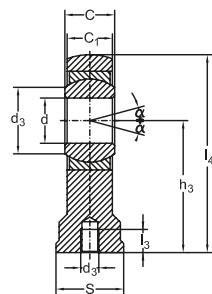
D <sub>1</sub> max	D <sub>2</sub> max	D <sub>3</sub> max	S <sub>2</sub>	Load ratings			α*	Designation	Mass
				dyn.	kN	stat.			
							-	kg	
9	12	17	10	1,7	5,7	15	15	<b>SQZ5 C</b>	0,025
9	12	17	10	1,7	5,7	15	15	<b>SQZ5 C-RS</b>	0,025
10	13	20	10	2,2	7,5	15	15	<b>SQZ6 C</b>	0,040
10	13	20	10	2,2	7,5	15	15	<b>SQZ6 C-RS</b>	0,040
12,5	16	24	13	3,3	11	15	15	<b>SQZ8 C</b>	0,075
12,5	16	24	13	3,3	11	15	15	<b>SQZ8 C-RS</b>	0,075
15	19	28	16	4,8	16	15	15	<b>SQZ10 C</b>	0,121
15	19	28	16	4,8	16	15	15	<b>SQZ10 C-RS</b>	0,121
17,5	22	32	18	6,6	22	15	15	<b>SQZ12 C</b>	0,187
17,5	22	32	18	6,6	22	15	15	<b>SQZ12 C-RS</b>	0,187
20	25	36	21	8,7	29	11	11	<b>SQZ14 C</b>	0,277
20	25	36	21	8,7	29	11	11	<b>SQZ14 C-RS</b>	0,277
22	27	40	24	10	33	11	11	<b>SQZ16 C</b>	0,361
22	27	40	24	10	33	11	11	<b>SQZ16 C-RS</b>	0,361
25	31	45	27	11	37	11	11	<b>SQZ18 C</b>	0,539
25	31	45	27	11	37	11	11	<b>SQZ18 C-RS</b>	0,539
27,5	34	45	30	11	37	7,5	7,5	<b>SQZ20 C</b>	0,575
27,5	34	45	30	11	37	7,5	7,5	<b>SQZ20 C-RS</b>	0,575
30	37	50	30	14	46	7,5	7,5	<b>SQZ22 C</b>	0,757
30	37	50	30	14	46	7,5	7,5	<b>SQZ22 C-RS</b>	0,757

\*The sizes are not binding.

C - to line SF1 material on the surface of spherical plain. The shank of ball joint housing may be left - hand thread, for left - hand thread, suffix "L" is added to bearings number and thread sign, e. g. SQL6C, M6L - 6H.

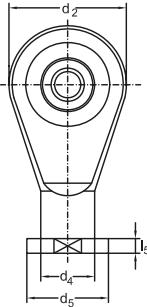
## Combination (series e) rod ends

(ISO 6126 - 1982)



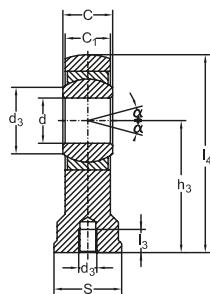
**Dimensions**

d	B	C <sub>1</sub> max	d <sub>1</sub> min	d <sub>2</sub> max	d <sub>3</sub>	h <sub>1</sub>	l <sub>3</sub> min	l <sub>4</sub> max	l <sub>5</sub> max	d <sub>4</sub> max
mm										
<b>5</b>	6	4,5	7	21	M5	30	11	42	5	10
<b>6</b>	6	4,5	8	21	M6	30	11	42	5	11
	6	4,5	8	21	M6	30	11	42	5	11
<b>8</b>	8	6,5	10	24	M8	36	15	49	5	13
	8	6,5	10	24	M8	36	15	49	5	13
<b>10</b>	9	7,5	13	29	M10	43	15	58	6,5	16
	9	7,5	13	29	M10	43	15	58	6,5	16
<b>12</b>	10	8,5	15	34	M12	50	18	67	7	18
	10	8,5	15	34	M12	50	18	67	7	18
<b>15</b>	12	10,5	18	40	M14	61	21	81	8	21
	12	10,5	18	40	M14	61	21	81	8	21
	12	10,5	18	40	M14	61	21	81	8	21
<b>17</b>	14	11,5	20	46	M16	67	24	90	10	24
	14	11,5	20	46	M16	67	24	90	10	24
	14	11,5	20	48	M16	67	24	90	10	24
<b>20</b>	16	13,5	24	53	M20x1,5	77	30	104	10	28
	16	13,5	24	53	M20x1,5	77	30	104	10	28
	16	13,5	24	53	M20x1,5	77	30	104	10	28
<b>25</b>	20	18	29	64	M24x2	94	36	126	12	35
	20	18	29	64	M24x2	94	36	126	12	35
	20	18	29	64	M24x2	94	36	126	12	35
<b>30</b>	22	20	34	73	M30x2	110	45	147	15	42
	22	20	34	73	M30x2	110	45	147	15	42
	22	20	34	73	M30x2	110	45	147	15	42

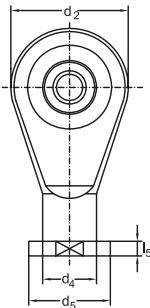


$d_5$ max mm	S	Load ratings			$\alpha^*$	Designation	Mass kg
		dyn.	stat.				
13	10	3,4	8,1	13	-	<b>SI5 E</b>	0,016
13	11	3,4	8,1	13	-	<b>SI6 E</b>	0,017
13	11	3,4	8,1	13	-	<b>SI6 C**</b>	0,017
16	13	5,5	12,9	15	-	<b>SI8 E</b>	0,035
16	13	5,5	12,9	15	-	<b>SI8 C**</b>	0,035
19	16	8,1	17,6	12	-	<b>SI10 E</b>	0,061
19	16	8,1	17,6	12	-	<b>SI10 C**</b>	0,061
22	18	10,8	24,5	10	-	<b>SI12 E</b>	0,096
22	18	10,8	24,5	10	-	<b>SI12 C**</b>	0,096
26	21	17	36	8	-	<b>SI15 ES</b>	0,162
26	21	17	36	8	-	<b>SI15 ES-2RS</b>	0,162
26	21	17	36	8	-	<b>SI15 C**</b>	0,162
29	24	21	45	10	-	<b>SI17 ES</b>	0,233
29	24	21	45	10	-	<b>SI17 ES-2RS</b>	0,233
29	24	21	45	10	-	<b>SI17 C**</b>	0,233
34	30	30	60	9	-	<b>SI20 ES</b>	0,324
34	30	30	60	9	-	<b>SI20 ES-2RS</b>	0,324
34	30	30	60	9	-	<b>SI20 C**</b>	0,324
42	36	48	83	7	-	<b>SI25 ES</b>	0,625
42	36	48	83	7	-	<b>SI25 ES-2RS</b>	0,625
42	36	48	83	7	-	<b>SI25 C**</b>	0,625
50	46	62	110	6	-	<b>SI30 ES</b>	0,976
50	46	62	110	6	-	<b>SI30 ES-2RS</b>	0,976
50	46	62	110	6	-	<b>SI30 C**</b>	0,976

## Combination (series e) rod ends (ISO 6126 - 1982)



Dimensions										
d	B	C <sub>1</sub> max	d <sub>1</sub> min	d <sub>2</sub> max	d <sub>3</sub>	h <sub>1</sub>	l <sub>3</sub> min	l <sub>4</sub> max	l <sub>5</sub> max	d <sub>4</sub> max
mm										
<b>35</b>	25	22	39	82	M36x2	125	60	167	15	48
	25	22	39	82	M36x2	125	60	167	15	48
	25	22	39	82	M36x2	125	60	167	15	48
<b>40</b>	28	24	45	92	M39x2	142	65	190	18	52
	28	24	45	92	M39x2	142	65	190	18	52
	28	24	45	92	M39x2	142	65	190	18	52
<b>45</b>	32	28	50	102	M42x3	145	65	199	20	58
	32	28	50	102	M42x3	145	65	199	20	58
	32	28	50	102	M42x3	145	65	199	20	58
<b>50</b>	35	31	55	112	M45x3	160	68	221	20	62
	35	31	55	112	M45x3	160	68	221	20	62
	35	31	55	112	M45x3	160	68	221	20	62
<b>60</b>	44	39	66	135	M52x3	175	70	247	20	70
	44	39	66	135	M52x3	175	70	247	20	70
	44	39	66	135	M52x3	175	70	247	20	70
<b>70</b>	49	43	77	160	M56x4	200	80	283	20	80
	49	43	77	160	M56x4	200	80	283	20	80
	49	43	77	160	M56x4	200	80	283	20	80
<b>80</b>	55	48	88	180	M64x4	230	85	325	25	95
	55	48	88	180	M64x4	230	85	325	25	95
	55	48	88	180	M64x4	230	85	325	25	95



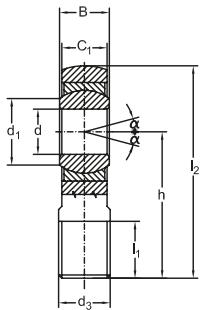
$d_5$ max mm	S	Load ratings			$\alpha^*$	Designation	Mass kg
		dyn.	stat.				
58	55	80	146	6	SI35 ES	1,52	
58	55	80	146	6	SI35 ES-2RS	1,52	
58	55	80	146	6	SI35 C**	1,52	
65	60	100	180	7	SI40 ES	2,06	
65	60	100	180	7	SI40 ES-2RS	2,06	
65	60	100	180	7	SI40 C**	2,06	
70	65	127	240	7	SI45 ES	2,72	
70	65	127	240	7	SI45 ES-2RS	2,72	
70	65	127	240	7	SI45 C-2RS**	2,72	
75	70	156	290	6	SI50 ES	3,57	
75	70	156	290	6	SI50 ES-2RS	3,57	
75	70	156	290	6	SI50 ES-2RS**	3,57	
88	80	245	450	6	SI60 ES	5,63	
88	80	245	450	6	SI60 ES-2RS	5,63	
88	80	245	450	6	SI60 ES-2RS**	5,63	
98	85	315	610	6	SI70 ES	8,33	
98	85	315	610	6	SI70 ES-2RS	8,33	
98	85	315	610	6	SI70 ES-2RS**	8,33	
110	95	400	750	6	SI80 ES	13,04	
110	95	400	750	6	SI80 ES-2RS	13,04	
110	95	400	750	6	SI80 ES-2RS**	13,04	

SIL..ES - for left hand thread. Suffix "L" is added to bearings number and thread sign, eg. SIL30ES. Sliding contact surface: steel/steel. Available with increased thread

\*The sizes are not binding.

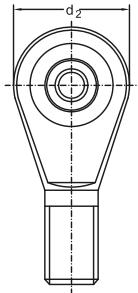
\*\*Sliding contact surface: steel/PTFE.

## Combination (series e) rod ends (ISO 6126 - 1982)



SA...E/ES  
SA...ES2RS

d	B	Dimensions					h	$l_1$ min	$l_2$ max	dyn.	stat.	$\alpha^*$	Load ratings		Designation	Mass
		$C_1$ max	$d_1$ min	$d_2$ max	$d_3$								kN	kN		
mm																
<b>5</b>	6	4,5	7	21	M5	36	16	48	3,4	8,1	1		<b>SA5 E</b>	0,011		
<b>6</b>	6	4,5	8	21	M6	36	16	48	3,4	8,1	13		<b>SA6 E</b>	0,013		
	6	4,5	8	21	M6	42	21	48	3,4	8,1	13		<b>SA6 C**</b>	0,013		
<b>8</b>	8	6,5	10	24	M8	42	21	55	5,5	12,9	15		<b>SA8 E</b>	0,026		
	8	6,5	10	24	M8	42	21	55	5,5	12,9	15		<b>SA8 C**</b>	0,026		
<b>10</b>	9	7,5	13	29	M10	48	26	63	8,1	17,8	12		<b>SA10 E</b>	0,044		
	9	7,5	13	29	M10	48	26	63	8,1	17,8	12		<b>SA10 C**</b>	0,044		
<b>12</b>	10	8,5	15	34	M12	54	28	71	10,8	24,5	10		<b>SA12 E</b>	0,066		
	10	8,5	15	34	M12	54	28	71	10,8	24,5	10		<b>SA12 C**</b>	0,066		
<b>15</b>	12	105	18	40	M14	63	34	83	17	36	8		<b>SA15 ES</b>	0,121		
	12	105	18	40	M14	63	34	83	17	36	8		<b>SA15 ES-2RS</b>	0,121		
	12	105	18	40	M14	63	34	83	17	36	8		<b>SA15 C**</b>	0,121		
<b>17</b>	14	115	20	46	M16	69	36	92	21	45	10		<b>SA17 ES</b>	0,172		
	14	115	20	46	M16	69	36	92	21	45	10		<b>SA17 ES-2RS</b>	0,172		
	14	115	20	46	M16	69	36	92	21	45	10		<b>SA17 C**</b>	0,172		
<b>20</b>	16	135	24	53	M20x1,5	78	43	105	30	60	9		<b>SA20 ES</b>	0,283		
	16	135	24	53	M20x1,5	78	43	105	30	60	9		<b>SA20 ES-2RS</b>	0,283		
	16	135	24	53	M20x1,5	78	43	105	30	60	9		<b>SA20 C**</b>	0,283		
<b>25</b>	20	18	29	64	M24x2	94	53	126	48	83	7		<b>SA25 ES</b>	0,504		
	20	18	29	64	M24x2	94	53	126	48	83	7		<b>SA25 ES-2RS</b>	0,504		
	20	18	29	64	M24x2	94	53	126	48	83	7		<b>SA25 C**</b>	0,504		
<b>30</b>	22	20	34	73	M30x2	110	65	147	62	110	6		<b>SA30 ES</b>	0,835		
	22	20	34	73	M30x2	110	65	147	62	110	6		<b>SA30 ES-2RS</b>	0,835		
	22	20	34	73	M30x2	110	65	147	62	110	6		<b>SA30 C**</b>	0,835		



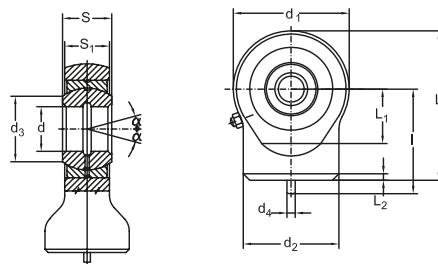
d	B	Dimensions					h	Load ratings			Designation	Mass
		C <sub>1</sub> max	d <sub>1</sub> min	d <sub>2</sub> max	d <sub>3</sub>	I <sub>1</sub> min		I <sub>2</sub> max	dyn.	stat.		
mm										kN	kN	
<b>35</b>	25	22	39	82	M36x2	140	82	182	80	148	6	<b>SA35 ES</b> 1,41
	25	22	39	82	M36x3	140	82	182	80	148	6	<b>SA35 ES-2RS</b> 1,41
	25	22	39	82	M36x3	140	82	182	80	146	6	<b>SA35 C-2RS**1,41</b>
<b>40</b>	28	24	45	92	M39x3	150	86	198	100	180	7	<b>SA40 ES</b> 1,86
	28	24	45	92	M39x3	150	86	198	100	180	7	<b>SA40 ES-2RS</b> 1,86
	28	24	45	92	M39x3	150	86	198	100	180	7	<b>SA40 2RSC**1,86</b>
<b>45</b>	32	28	50	102	M42x3	163	92	217	127	240	7	<b>SA45 ES</b> 2,57
	32	28	50	102	M42x3	163	92	217	127	240	7	<b>SA45 ES-2RS</b> 2,57
	32	28	50	102	M42x3	163	92	217	127	240	7	<b>SA45 C-2RS**2,57</b>
<b>50</b>	35	31	55	112	M45x3	185	104	246	156	290	6	<b>SA50 ES</b> 3,58
	35	31	55	112	M45x3	185	104	246	156	290	6	<b>SA50 ES-2RS</b> 3,58
	35	31	55	112	M45x3	185	104	246	156	290	6	<b>SA50 C-2RS**3,58</b>
<b>60</b>	44	39	66	135	M52x3	210	115	282	245	450	6	<b>SA60 ES</b> 5,73
	44	39	66	135	M52x3	210	115	282	245	450	6	<b>SA60 ES-2RS</b> 5,73
	44	39	66	135	M52x3	210	115	282	245	450	6	<b>SA60 C-2RS**5,73</b>
<b>70</b>	49	43	77	160	M56x4	235	125	318	315	610	6	<b>SA70 ES</b> 7,94
	49	43	77	160	M56x4	235	125	318	315	610	6	<b>SA70 ES-2RS</b> 7,94
	49	43	77	160	M56x4	235	125	318	315	610	6	<b>SA70 C-2RS**7,94</b>
<b>80</b>	55	48	88	180	M64x4	270	140	365	400	750	6	<b>SA80 ES</b> 12,06
	55	48	88	180	M64x4	270	140	365	400	750	6	<b>SA80 ES-2RS</b> 12,06
	55	48	88	180	M64x4	270	140	365	400	750	6	<b>SA80 C-2RS**12,06</b>

For left hand thread. Suffix "L" is added to bearings number and thread sign, eg. SAL30ES. Sliding contact surface: steel/steel. Available with increased thread

\*The sizes are not binding.

\*\*Sliding contact surface: steel/PTFE.

## Rod ends for hydraulic components

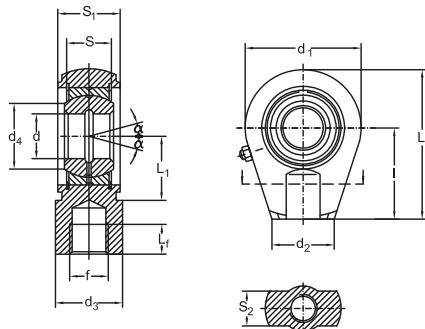


TAC...

Dimensions											Designation
d	S	d <sub>1</sub>	l	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	S <sub>1</sub>	L	L <sub>1</sub>	L <sub>2</sub>	-
mm											
<b>10</b>	9	29	24	15	13	3	7	38,5	14	2	<b>TAC 210</b>
<b>12</b>	10	34	27	17,5	15	3	8	44	16	2	<b>TAC 212</b>
<b>15</b>	12	40	31	21	18	4	10	51	18	2,5	<b>TAC 215</b>
<b>17</b>	14	46	35	24	20,5	4	11	58	20	3	<b>TAC 217</b>
<b>20</b>	16	53	38	27,5	24	4	13	65,4	23	3	<b>TAC 220</b>
<b>25</b>	20	64	45	33,5	29	4	17	77	27	4	<b>TAC 225</b>
<b>30</b>	22	73	51	40	34	4	19	87,5	30	4	<b>TAC 230</b>
<b>35</b>	25	82	61	47	39,5	4	21	102	37	4	<b>TAC 235</b>
<b>40</b>	28	92	69	52	45	4	23	115	44	5	<b>TAC 240</b>
<b>45</b>	32	102	77	58	50,5	6	27	128	48	5	<b>TAC 245</b>
<b>50</b>	35	112	88	62	56	6	30	144	58	6	<b>TAC 250</b>
<b>60</b>	44	135	100	70	66,5	6	38	167,5	68	8	<b>TAC 260</b>
<b>70</b>	49	160	115	80	77,5	6	42	195	78	10	<b>TAC 270</b>
<b>80</b>	55	180	141	95	89	6	47	231	91	10	<b>TAC 280</b>

Contact surface: steel / steel  
The sizes are not binding.

## Rod ends for hydraulic components

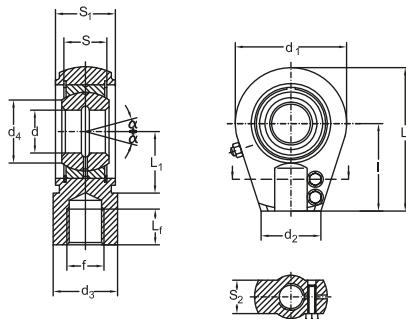


TAPR...N

Dimensions													Designation
d	S	d <sub>1</sub>	l	L <sub>f</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	L	L <sub>1</sub>	f	-
mm													
<b>20</b>	16	56	50	17	36	25	24	19	17	80	25	M16x1,5	<b>TAPR 420 N</b>
<b>25</b>	20	56	50	17	36	25	29	23	21	80	28	M16x1,5	<b>TAPR 425 N</b>
<b>30</b>	22	64	60	23	40	32	34	28	26	94	30	M22x1,5	<b>TAPR 430 N</b>
<b>35</b>	25	78	70	29	50	40	39,5	30	28	112	38	M28x1,5	<b>TAPR 435 N</b>
<b>40</b>	28	94	85	36	60	49	45	35	33	135	45	M35x1,5	<b>TAPR 440 N</b>
<b>50</b>	35	116	105	46	72	61	56	40	37	168	55	M45x1,5	<b>TAPR 450 N</b>
<b>60</b>	44	130	130	59	90	75	66,5	50	46	200	65	M58x1,5	<b>TAPR 460 N</b>
<b>70</b>	49	154	150	66	100	86	77,5	55	51	232	75	M65x1,5	<b>TAPR 470 N</b>
<b>80</b>	55	176	170	81	125	102	89	60	55	265	80	M80x2	<b>TAPR 480 N</b>
<b>90</b>	60	206	210	101	146	124	98	65	60	323	90	M100x2	<b>TAPR 490 N</b>
<b>100</b>	70	230	235	111	166	138	109,5	70	65	360	105	M110x2	<b>TAPR 495 N</b>
<b>110</b>	70	265	265	125	190	152	121	80	75	407,5	115	M120x3	<b>TAPR 496 N</b>
<b>120</b>	85	340	310	135	257	172	135,5	90	85	490	140	M130x5	<b>TAPR 497 N</b>

Contact surface: steel / steel  
The sizes are not binding.

## Rod ends for hydraulic components

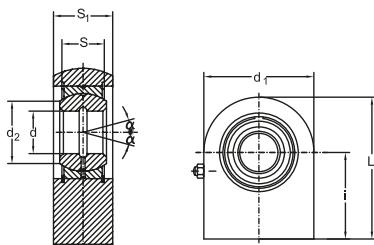


TAPR...U

Dimensions													Designation
d	S	d <sub>1</sub>	l	L <sub>f</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	L	L <sub>1</sub>	f	-
mm													
<b>20</b>	16	56	50	17	36	25	24	19	17	80	25	M16x1,5	<b>TAPR 520 U</b>
<b>25</b>	20	56	50	17	36	25	29	23	21	80	28	M16x1,5	<b>TAPR 525 U</b>
<b>30</b>	22	64	60	23	40	32	34	28	26	94	30	M16x1,5	<b>TAPR 530 U</b>
<b>35</b>	25	78	70	29	50	40	39,5	30	28	112	38	M28x1,5	<b>TAPR 535 U</b>
<b>40</b>	28	94	85	36	60	49	45	35	33	135	45	M35x1,5	<b>TAPR 540 U</b>
<b>50</b>	35	116	105	46	72	61	56	40	37	168	55	M45x1,5	<b>TAPR 550 U</b>
<b>60</b>	44	130	130	59	90	75	66,5	50	46	200	65	M58x1,5	<b>TAPR 560 U</b>
<b>70</b>	49	154	150	66	100	86	77,5	55	51	232	75	M65x1,5	<b>TAPR 570 U</b>
<b>80</b>	55	176	170	81	125	102	89	60	55	265	80	M80x2	<b>TAPR 580 U</b>
<b>90</b>	60	206	210	101	146	124	98	65	60	323	90	M100x2	<b>TAPR 590 U</b>
<b>100</b>	70	230	235	111	168	138	109,5	70	65	360	105	M110x2	<b>TAPR 595U</b>
<b>110</b>	70	265	265	125	190	152	121	80	75	407,5	115	M120x3	<b>TAPR 596 U</b>
<b>120</b>	85	340	310	135	257	172	135	90	85	490	140	M130x5	<b>TAPR 597 U</b>

Contact surface: steel / steel  
The sizes are not binding.

## Rod ends for hydraulic components



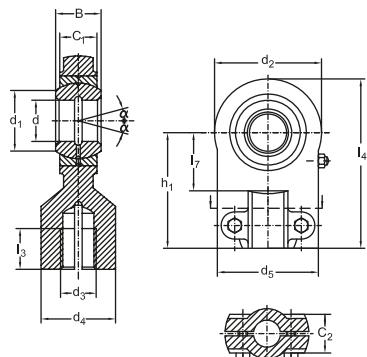
TPN....

Dimensions							Designation
d	S	d <sub>1</sub>	i	d <sub>2</sub>	S <sub>1</sub>	L	-
mm							
<b>20</b>	16	50	38	24	19	63	<b>TPN 320</b>
<b>25</b>	20	55	45	29	23	72,5	<b>TPN 325</b>
<b>30</b>	22	65	51	34	28	83,5	<b>TPN 330</b>
<b>35</b>	25	83	61	39,5	30	102,5	<b>TPN 335</b>
<b>40</b>	28	100	69	45	35	119	<b>TPN 340</b>
<b>45</b>	32	110	77	50,5	40	132	<b>TPN 345</b>
<b>50</b>	35	123	88	56	40	149,5	<b>TPN 350</b>
<b>60</b>	44	140	100	66,5	50	170	<b>TPN 360</b>
<b>70</b>	49	164	115	77,5	55	197	<b>TPN 370</b>
<b>80</b>	55	180	141	89	60	231	<b>TPN 380</b>
<b>90</b>	60	226	150	98	65	263	<b>TPN 390</b>
<b>100</b>	70	250	170	109,5	70	295	<b>TPN 395</b>
<b>110</b>	70	295	185	121	80	332,5	<b>TPN 396</b>
<b>120</b>	85	360	210	135,5	90	390	<b>TPN 397</b>

Contact surface: steel / steel  
The sizes are not binding.

## Rod ends for hydraulic components

DIN 24555



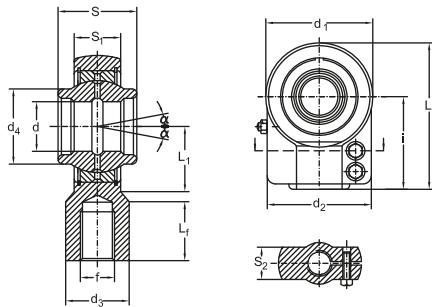
TAPR...DO

Dimensions													Designation
d	B	d <sub>2</sub>	d <sub>1</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	C <sub>1</sub>	C <sub>2</sub>	h <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>7</sub>	-
mm													
<b>12</b>	10	32	15	M10x1,25	17	40	8	13	42	15	58	18	<b>TAPR 701 DO</b>
<b>16</b>	14	42	20	M12x1,25	21	45	11	13	48	17	69	22	<b>TAPR 702 DO</b>
<b>20</b>	16	50	25	M14x1,5	25	55	13	17	58	19	83	28	<b>TAPR 703 DO</b>
<b>25</b>	20	62	29	M16x1,5	30	62	-	68	23	99	34		<b>TAPR 704 DO</b>
<b>30</b>	22	76	34	M20x1,5	36	80	19	-	85	29	123	38	<b>TAPR 705 DO</b>
<b>40</b>	28	96	45	M27x2	45	90	23	-	105	37	153	48	<b>TAPR 706 DO</b>
<b>50</b>	35	116	55	M33x2	55	105	30	-	130	46	188	62	<b>TAPR 707 DO</b>
<b>60</b>	44	150	66	M42x2	68	134	38	-	150	57	255	74	<b>TAPR 708 DO</b>
<b>80</b>	55	195	88	M48x2	78	156	47	-	185	64	282,5	98	<b>TAPR 709 DO</b>
<b>100</b>	70	235	109	M64x3	100	190	57	-	240	86	357,5	122	<b>TAPR 710 DO</b>

Contact surface: steel / steel  
The sizes are not binding.

## Rod ends for hydraulic components

DIN 24338



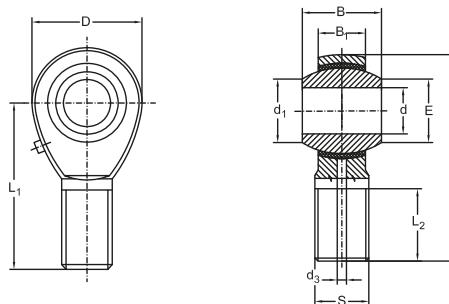
TAPR...CE

Dimensions														Designation
d	S	d <sub>1</sub>	l	L <sub>f</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	S <sub>1</sub>	S <sub>2</sub>	L	L <sub>1</sub>	f	-	
mm														
<b>12</b>	12	32	38	17	32	16	15,5	10,5	12	54	14	M12x1,25	<b>TAPR 612 CE</b>	
<b>16</b>	16	40	44	19	40	21	20	13	11,5	64	18	M14x1,5	<b>TAPR 616 CE</b>	
<b>20</b>	20	47	52	23	47	25	25	17	14	77	22	M16x1,5	<b>TAPR 620 CE</b>	
<b>25</b>	25	58	65	29	54	30	30,5	21	17	96	27	M20x1,5	<b>TAPR 625 CE</b>	
<b>32</b>	32	70	80	37	66	38	38	27	22	118	32	M27x2	<b>TAPR 632 CE</b>	
<b>40</b>	40	89	97	46	80	47	46	32	26	145,5	41	M33x2	<b>TAPR 640 CE</b>	
<b>50</b>	50	108	120	57	96	58	57	40	32	179	50	M24x2	<b>TAPR 650 CE</b>	
<b>63</b>	63	132	140	64	114	70	71,5	52	38	211	62	M48x2	<b>TAPR 663 CE</b>	
<b>70</b>	70	155	160	76	135	80	79	57	42	245	70	M56x2	<b>TAPR 670 CE</b>	
<b>80</b>	80	168	180	86	148	90	91	66	48	270	78	M64x3	<b>TAPR 680 CE</b>	
<b>90</b>	90	185	195	91	160	100	99	72	52	296	85	M72x3	<b>TAPR 690 CE</b>	
<b>100</b>	100	210	210	96	178	110	113	84	62	322	98	M80x3	<b>TAPR 695 CE</b>	
<b>110</b>	110	235	235	101	190	125	124	88	62	364	105	M90x3	<b>TAPR 696 CE</b>	
<b>125</b>	125	264	260	106	200	135	138	103	72	405	120	M100x3	<b>TAPR 697 CE</b>	

Contact surface: steel / steel  
The sizes are not binding.

## Rod ends

ISO 6126 - 1982



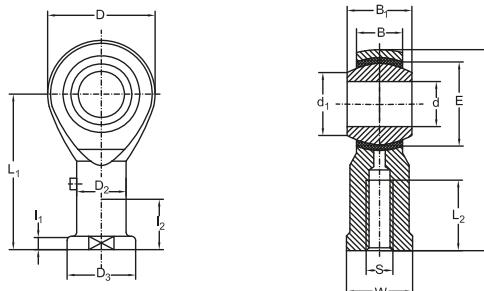
POS  
POS...EC

d	d <sub>1</sub>	B <sub>1</sub>	E	B	D	S	L <sub>1</sub>	L <sub>2</sub>	Load ratings		Designation	Mass kg
									dyn.	stat.		
mm												
<b>5</b>	7,7	8	11,11	7	16	M5x0,8	33	20	3,2	7	<b>POS5*</b>	0,014
	7,7	8	11,11	7,5	18	M5	33	20	3,2	7	<b>POS5 EC**</b>	0,014
<b>6</b>	9	9	12,70	7	18	M6x1	36	22	3,5	8	<b>POS6*</b>	0,019
	8,9	9	12,70	7,5	20	M6	36	22	3,5	8	<b>POS6 EC**</b>	0,019
<b>8</b>	10,4	12	15,88	9	22	M8x1,25	42	25	5,8	13	<b>POS8*</b>	0,036
	10,3	12	15,88	9,5	24	M8	42	25	5,8	13	<b>POS8 EC**</b>	0,036
<b>10</b>	12,9	14	19,05	11	26	M10x1,5	48	29	8,6	18	<b>POS10*</b>	0,060
	12,9	14	19,05	11,5	30	M10	48	29	8,6	18	<b>POS10 EC**</b>	0,070
<b>12</b>	15,4	16	22,23	12	30	M12x1,75	54	33	11,5	24	<b>POS12*</b>	0,089
	15,4	16	22,23	12,5	34	M12	54	33	11,5	24	<b>POS12 EC*</b>	0,110
<b>14</b>	16,9	19	25,40	14	34	M14x2	60	36	17,5	36	<b>POS14*</b>	0,129
	16,8	19	25,40	14,5	38	M14	60	36	17,5	36	<b>POS14 EC**</b>	0,130
<b>16</b>	19,4	21	28,58	15	38	M16x2	66	40	20	40	<b>POS16*</b>	0,181
	19,3	21	28,58	15,5	42	M16	66	40	20	40	<b>POS16 EC**</b>	0,220
<b>17</b>	20,6	22	30,16	16	40	M16x1,5	69	42	22	45	<b>POS17*</b>	0,206
<b>18</b>	21,9	23	31,75	17	42	M18x1,5	72	44	27	50	<b>POS18*</b>	0,250
	21,8	23	31,75	17,5	46	M18x1,5	72	44	27	50	<b>POS18 EC**</b>	0,290
<b>20</b>	24,4	25	34,93	18	46	M20x1,5	78	47	31	60	<b>POS20*</b>	0,333
	24,3	25	34,93	18,5	50	M20x1,5	78	47	31	60	<b>POS20 EC**</b>	0,360
<b>22</b>	25,9	28	38,10	20	50	M22x1,5	84	51	43	72	<b>POS22*</b>	0,430
	25,8	28	38,1	21	56	M22x1,5	84	51	43	72	<b>POS22 EC**</b>	0,490
<b>25</b>	29,5	31	42,86	22	56	M24x2	94	57	50	85	<b>POS25*</b>	0,575
	29,5	31	42,86	23	60	M24x2	94	57	50	85	<b>POS25 EC**</b>	0,65
<b>28</b>	32,3	35	47,59	25	66	M27x2	103	62	60	90	<b>POS28*</b>	0,800
	32,2	35	47,59	26	66	M27x2	103	62	60	90	<b>POS28 EC**</b>	0,870
<b>30</b>	34,9	37	50,80	26	67	M30x2	110	66	66	110	<b>POS30*</b>	0,996
	34,8	37	50,80	27	70	M30x2	110	66	66	110	<b>POS30 EC**</b>	1,060

\*For left hand thread, suffix "L" is added to bearings number and thread sign, eg. TSML. Sliding contact surface: steel/steel. Available with increased thread. Sliding contact surface: steel/bronze.

\*\*For left hand thread, suffix "L" is added to bearings number and thread sign, eg. TSML...C. Sliding contact surface: steel/steel. Available with increased thread. Sliding contact surface: steel/PTFE. The sizes are not binding.

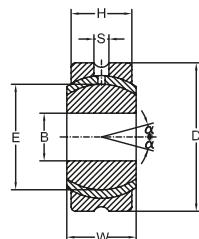
**Rod ends**  
ISO 6126 - 1982



PHS  
PHS...EC

Dimensions												Load ratings	Designation	Mass			
d	d <sub>1</sub>	B <sub>1</sub>	E	B	D	S	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	D <sub>3</sub>	I <sub>1</sub>	W	dyn. stat.	kN	kN	-	kg
mm																	
<b>5</b>	7,7	8	11,11	7	16	M5x0,8	27	8	9	12	4	9	3,2	7	<b>PHS5</b>	0,018	
	7,7	8	11,11	7,5	18	M5	27	8	9	12	4	10	3,2	7	<b>PHS5 EC</b>	0,018	
<b>6</b>	9,0	9	12,71	7	18	M6x1	30	9	10	13	5	11	3,5	8	<b>PHS6</b>	0,026	
	8,9	9	12,71	7,5	20	M6	30	9	10	13	5	10	3,5	8	<b>PHS6 EC</b>	0,026	
<b>8</b>	10,4	12	15,88	9	22	M8x1,25	36	12	12,5	16	5	14	5,8	13	<b>PHS8</b>	0,045	
	10,3	12	15,88	9,5	24	M8	36	12	12,5	16	5	13	5,8	13	<b>PHS8 EC</b>	0,045	
<b>10</b>	12,9	14	19,05	11	26	M10x1,5	43	15	15	19	6,5	17	8,6	18	<b>PHS10</b>	0,076	
	12,9	14	19,05	11	26	M10x1,25	43	15	15	19	6,5	17	8,6	18	<b>PHS10,1</b>	0,076	
	12,9	14	19,05	11,5	30	M10	43	15	15	19	6,5	16	8,6	18	<b>PHS10 EC</b>	0,088	
	12,9	14	19,05	11,5	30	M10x1,25	43	15	15	19	6,5	16	8,6	18	<b>PHS10,1 EC</b>	0,088	
<b>12</b>	15,4	16	22,23	12	30	M12x1,75	50	18	17,5	22	6,5	19	11,5	24	<b>PHS12</b>	0,114	
	15,4	16	22,23	12	30	M12x1,25	50	18	17,5	22	6,5	19	11,5	24	<b>PHS12,1</b>	0,114	
	15,4	16	22,23	12,5	34	M12	50	18	17,5	22	6,5	18	11,5	24	<b>PHS12 EC</b>	0,120	
	15,4	16	22,23	12,5	34	M12x1,25	50	18	17,5	22	6,5	18	11,5	24	<b>PHS12,1 EC</b>	0,120	
<b>14</b>	16,9	19	25,40	14	34	M14x2	57	21	20	25	8	22	17,5	36	<b>PHS14</b>	0,158	
	16,8	19	25,40	14,5	38	M14	57	21	20	25	8	21	17,5	36	<b>PHS14 EC</b>	0,140	
<b>16</b>	19,4	21	28,58	15	38	M16x2	64	24	22	27	8	22	20	40	<b>PHS16</b>	0,200	
	19,4	21	28,58	15	38	M16x1,5	64	24	22	27	8	22	20	40	<b>PHS16,1</b>	0,200	
	19,3	21	28,58	15,5	42	M16	64	24	22	27	8	24	20	40	<b>PHS16 EC</b>	0,240	
	19,3	21	28,58	15,5	42	M16x1,5	64	24	22	27	8	24	20	40	<b>PHS16,1 EC</b>	0,240	
<b>17</b>	20,6	22	30,16	16	40	M16x1,5	67	25	24	31	10	27	22	45	<b>PHS17</b>	0,259	
<b>18</b>	21,9	23	31,75	17	42	M18x1,5	71	27	25	31	10	27	27	50	<b>PHS18</b>	0,288	
	21,8	23	31,75	17,5	46	M18	71	27	25	31	10	27	27	50	<b>PHS18 EC</b>	0,320	
<b>20</b>	24,4	25	34,93	18	46	M20x1,5	77	30	27,5	37	10	30	31	60	<b>PHS20</b>	0,372	
	24,3	25	34,93	18,5	50	M20	77	30	27,5	37	10	30	31	60	<b>PHS20 EC</b>	0,430	
<b>22</b>	25,9	28	38,10	20	50	M22x1,5	84	33	30	37	12	32	43	72	<b>PHS22</b>	0,475	
	25,8	28	38,10	21	56	M22	84	33	30	37	12	34	43	72	<b>PHS22 EC</b>	0,610	
	29,6	31	42,86	22	56	M24x2	94	36	33,5	42	12	36	50	85	<b>PHS25</b>	0,673	
<b>25</b>	29,5	31	42,86	23	60	M24	94	36	33,5	42	12	36	50	85	<b>PHS25 EC</b>	0,810	
<b>28</b>	32,3	35	47,59	25	66	M27x2	103	41	37	46	14	41	60	90	<b>PHS28</b>	0,950	
	32,2	35	47,59	26	66	M27	103	41	37	46	14	41	60	90	<b>PHS28 EC</b>	1,120	
<b>30</b>	34,9	37	50,80	26	67	M30x2	110	45	40	50	15	41	66	110	<b>PHS30</b>	1,050	
	34,8	37	50,80	27	70	M30	110	45	40	50	15	46	66	110	<b>PHS30 EC</b>	1,350	

## Spherical plain bearings



SSR

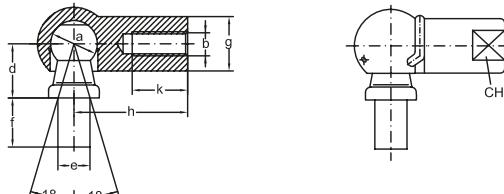
Dimensions mm	B	W	H	O	D	R	S	E	$\alpha$	Max static load ratings		Designation	Mass kg
										dyn.	stat.		
5	8	7	7,71	16	0,5	1,5	11,11	24	24	9,30	2,30	SSR5	0,010
6	9	7	8,96	18	0,5	1,5	12,7	28	28	10,70	2,70	SSR6	0,012
8	12	9	10,4	22	0,5	1,5	15,88	25	25	17,20	4,30	SSR8	0,024
10	14	11	12,92	26	0,5	1,5	19,05	23	23	25,10	6,30	SSR10	0,040
12	16	12	15,43	30	1	2	22,23	24	24	32,00	8,00	SSR12	0,058
14	19	14	16,86	34	1	2	25,4	23	23	42,70	10,70	SSR14	0,086
15	20	14	18,2	36	1	2	26,99	24	24	45,30	11,30	SSR15	0,098
16	21	15	19,39	38	1	2	28,58	24	24	51,40	12,90	SSR16	0,116
17	22	16	20,63	40	1	2,5	30,16	23	23	57,90	14,50	SSR17	0,135
18	23	17	21,89	42	1,5	2,5	31,75	23	23	64,80	162,0	SSR18	0,157
20	25	18	24,38	46	1,5	2,5	34,93	24	24	75,40	18,90	SSR20	0,200
22	28	20	25,84	50	1,5	2,5	38,1	23	23	91,40	22,90	SSR22	0,262
25	31	22	29,6	56	1,5	3	42,86	23	23	113,20	28,30	SSR25	0,362
28	35	25	32,29	62	1,5	3	47,83	22	22	142,90	35,70	SSR28	0,500
30	37	26	34,81	67	2	3	50,8	23	23	158,50	39,60	SSR30	0,608

Materials: - housing - steel  
- insert - bronze  
- ball - chrome steel

The sizes are not binding.

## Ball joint rod end with spring clamping

DIN 71802



B

BS

a H9/h8	b	d	e h11	f	g	h	k	Mass	
								CH*	B and BS
8	M5	9	5	4	8	22	10,2	7	12,85
8	M5	9	5	7,5	8	22	10,2	7	13,35
10	M6	11	6	4,5	10	25	11,5	8	21,3
10	M6	11	6	8	10	25	11,5	8	22
13	M8	13	8	5	13	30	14	11	43,2
13	M8	13	8	10	13	30	14	11	45
16	M10	16	10	6	16	35	15,5	13	82,3
16	M10	16	10	13	16	35	15,5	13	86,6
19	M14x1,5	20	14	12	22	45	21,5	17	181
19	M14x2	20	14	18	22	45	21,5	17	188,7

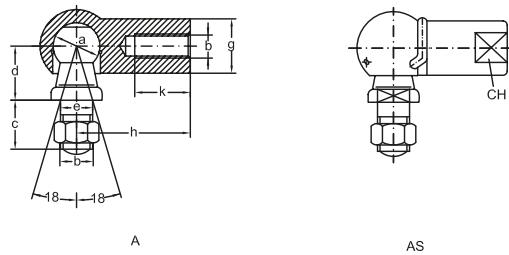
Surface: zinc - plating FeZN7 Uni 4721 - or coarse oiled surface by request.

\*Clamping plains.

C45 special.

The sizes are not binding.

**Ball joint rod end with spring clamping  
and safety ring**  
**DIN 71802**



**Dimensions**

a H9/h8	b M5 M6 M8 M10 M14x1,5	c 10 12 16 19 27	d 9 11 13 16 20	e h11	g 5 6 8 10 14	h 8 10 13 16 22	L <sub>1</sub> 25,2 30,2 38,2 47,5 62,5	L <sub>2</sub> 28,5 32,5 39,5 47 60	k 10,2 11,5 14 15,5 21,5	CH* 7 8 11 13 17	Mass A and AS g 15,2 25,2 53,1 102,8 220,9
mm										-	g
<b>8</b>	M5	10	9	5	8	22	25,2	28,5	10,2	<b>7</b>	15,2
<b>10</b>	M6	12	11	6	10	25	30,2	32,5	11,5	<b>8</b>	25,2
<b>13</b>	M8	16	13	8	13	30	38,2	39,5	14	<b>11</b>	53,1
<b>16</b>	M10	19	16	10	16	35	47,5	47	15,5	<b>13</b>	102,8
<b>19</b>	M14x1,5	27	20	14	22	45	62,5	60	21,5	<b>17</b>	220,9
<b>19</b>	M14x2	27	20	14	22	45	62,5	60	21,5	<b>17</b>	220,9

Surface: zinc - plating FeZN7 Uni 4721 - or coarse oiled surface by request.

\*Clamping plains.

C45 special.

The sizes are not binding.

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

604



605

URB

# Linear ball bearings bushing

## Load Rating

### Basic dynamic load rating

This term is arrived at based on an evaluation of a number of identical linear systems individually run in the same conditions, if 90% of them can run with the load with a constant value in a constant direction for a distance of 50 km without damage caused by rolling fatigue. This is the basis of the rating.

### Allowable static moment

This term defines the allowable limit value of static moment load with reference to the amount of permanent deformation similar to that used for evaluation of basic rated load ( $C_0$ ).

### Static safety factor

This factor is used based on the application condition as shown in Table 1.

### Basic static load rating

This term defines a static load such that, at the contacting position where the maximum stress is exercised, the sum of the permanent deformation of the rolling elements and that of the rolling plane is 0,0001 time of the diameter of the rolling elements.

Table 1  
Static safety factors

Condition of use	Low limit of $f_s$
When the shaft has less deflection and shock	1 to 2
When elastic deformation should be considered with respect to pinch load	2 to 4
When the equipment is subject to vibration and impacts	3 to 5

## Rating life

### Rating life of the linear system

As long as linear system reciprocates while being loaded, continuous stress acts on the linear system to cause flaking on the rolling bodies and planes because of material fatigue. The travelling distance of linear system until the first flaking occurs is called the life of the system. The life of the dimensions, structure, material, heat treatment and processing method, when used in the same conditions. This variation is brought about from the essential variations in the material fatigue itself. The rating life defined below is used as an index for the life expectancy of the linear system.

### Rating life

Rating life is the total travelling distance that 90% of a group of systems of the same size can reach without causing any flaking when they operate under the same conditions.

The rating life can be obtained from the following equation with the basic dynamic load rating and the load on the linear system:

For ball type:

$$L = \left(\frac{C}{P}\right)^3 \times 50$$

where:

L - rating life, km,  
C - basic dynamic load rating, N,  
P - load, N.

Consideration and influence of vibration impact loads and distribution of load should be taken into account when designing a linear motion system. It is difficult to calculate the actual load.

The rating life is also affected by the operating temperature. In these conditions, the expression (1) is arranged as follows:

For ball type:

$$L = \left( \frac{f_H^3 \times f_r \times f_C}{f_w \times P} \right)$$

where:

- $L$  - rating life, km,
- $f_H$  - hardness factor (see figure 1),
- $C$  - basic dynamic load rating, N,
- $f_T$  - temperature coefficient (see figure 2),
- $P$  - load, N,
- $f_C$  - contact coefficient (see table 2),
- $f_w$  - load coefficient (see table 3).

The rating life in hours can be calculated by obtaining the travelling distance per unit time. The rating life in hours can be obtained from the following expression when the stroke length and the number of strokes are constant:

$$L_h = \frac{L \times 10^3}{2l_s \times n_1 \times 60}$$

where:

- $L_h$  - rating life in hours, hr,
- $l_s$  - stroke length, m
- $L$  - rating life, km,
- $n_1$  - no of strokes per minute, cpm.

### Hardness factor

The shaft be sufficiently hardened when a linear bushing is used. If not properly hardened, permissible load is lowered and the life of the bushing will be shortened

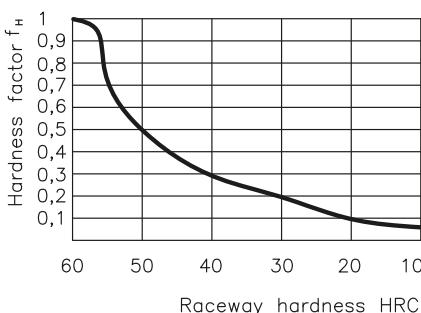


Fig. 1

### Temperature coefficient

If the temperature of the linear system exceeds 100°C, Hardness of the linear system and the

shaft lowers to deacrese the permissible load compared to that of the linear system used at room temperature rise shortens the rating life.

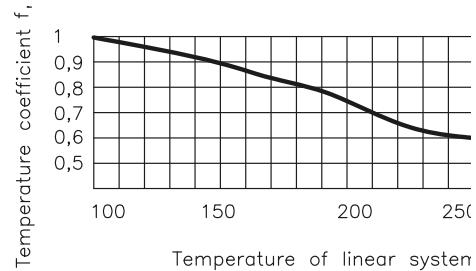


Fig. 2

### Contact coefficient

Generally two or more linear bushing are used on one shaft. Thus, the load on each linear system differs depending on each precessing accuracy. Because the linear bushing are not loaded equally, the number of linear bushing per shaft changes the permissible load of system.

### Contact coefficient

Table 2

Number of linear system per shaft	Contact coefficient $f_c$
1	1,00
2	0,81
3	0,72
4	0,66
5	0,61

### Load coefficient

When calculating the load on the linear system, it is necessary to accurately obtain object weight, inertial force based on motion speed, moment load, and each transition as time passes. However, it is difficult to calculate those values accurately because reciprocating motion involves the repetition of start and stop as well as vibration and impact. A more practical approach is to obtain the load coefficient by taking the actual oprating conditions into account.

Load coefficient		Table 3
Operating Conditions	$f_w$	
Operation at low speed (15 m/min. or less) without impulsive shock from outside	1,0 to 1,5	
Operation at intermediate speed (60 m/min. or less) without impulsive shock	1,5 to 2,0	
Operation at high speed (over 60 m/min.) with impulsive shock from outside	2,0 to 3,5	

## Frictional resistance

The static frictional resistance of the URB linear system is so low as to be only slightly different from the kinetic frictional resistance, enabling smooth linear movement from low to high speeds. In general, the friction resistance is expressed by the following equation.

$$F = \mu W + f,$$

where:

F - frictional resistance,  
 $\mu$  - coefficient of friction,  
W - load weight,  
f - sealing resistance.

The frictional resistance of each URB linear system depends on the model, load weight, speed, and lubricant. The sealing resistance depends on lip interference and lubricant, regardless of the load weight. The sealing resistance of one linear system is about 200 to 500 gf. The coefficient of friction depends on the load weight, moment load, and preload. Table 6 shows the coefficient of kinetic friction of each type of linear system which has been installed and lubricated properly and applied with normal load ( $P/C=0,2$ )

Coefficient of linear system friction			Table 4
Linear System Type	Models	Ambient Working Temperature	
Linear Bushing	LM LME LMB	0,002 to 0,003	

## Ambient working temperature

The ambient working temperature range for each URB linear system depends on the model. Consult URB on use outside the recommended temperature range.

Temperature conversion equation:

$$C = \frac{5}{9}(F - 32)$$

$$F = 32 + \frac{9}{5}C$$

Ambient working temperature			Table 5
Linear System Type	Models	Ambient Working Temperature	
Linear Bushing	LM LME LMB	-20 to 80°C	

## Lubrication and dust prevention

Using URB linear systems without lubrication increases the abrasion of the rolling elements, shortening the life span. The URB linear systems, therefore require appropriate lubrication. For lubrication URB recommends turbine oil conforming to ISO Standards G32 to G68 or lithium base soap grease no. 2. Some URB linear systems are sealed to block dust out and seal lubricant in. If used in a harsh or corrosive environment, however, apply a protective cover to the part involving linear motion.

## Structure and features

The URB linear bushing consists of an outer cylinder, ball retainer, balls and two end rings. The ball retainer which holds the balls, in the recirculating trucks in held inside the outer cylinder by end rings.

Those parts are assembled to optimize their required functions.

The outer cylinder is maintained sufficient hardness by heat treatment, therefore it ensures the bushings projected travel life and satisfactory durability.

The ball retainer is made from synthetics to reduce running noise.

### High precision and rigidity

The URB linear bushing is reduced from a solid steel outer cylinder and incorporates an industrial strength resin retainer.

### Ease of assembly

The standard type of URB linear bushing can be loaded from any direction. Precision control is possible using only the shaft supporter, and the mounting surface can be machined easily.

### Ease of replacement

URB linear bushing od each type are completely interchangeable because of their standardized dimensions and strict precision control. Replacement because of wear or damage is therefore easy and accurate.

### Variety of types

URB offers a full line of linear bushing: The standard, integral single - retainer closed type, the clearance adjustable type and the open type. The user can choose from among these according to the application requirements to be met.

### Linear ball bushing designation

Designation				
Group I	Group II	Group III	Group IV	
Type	Nominal shaft diameter	Modification	Seal	

#### Example:

LM 25 UU AJ

#### Type:

- LM - metric dimension series most widely used in Japan,  
LME - metric dimension series generally used in Europe,  
LMB - inch dimension series used mainly in USA.

#### Modification:

- No entry - standard type,  
AJ - adjustable type,  
OP - open type.

609

### Seal:

- No entry - no seal,  
U - seal on one side,  
UU - seals on both sides.

### Tolerance

Note that precision of inscribed circle diameters and outside diameters for the clearance adjustable type (...-AJ) and the open type (...-OP) indicates the value obtained before the corresponding type is subjected to cutting process.

### Load rating and life expectancy

The life of a linear bushing can be obtained from the following equation with the basic dynamic load rating and the load applied to the bush:

$$L = \left( \frac{f_H \times f_T \times f_C}{f_w \times P} \times \frac{C}{P} \right)^3 \times 50$$

where:

- L - rated life, km,  
C - basic dynamic load rating, N  
P - working load, N,  
 $f_w$  - load coefficient,  
 $f_H$  - hardness factor (see page 607),  
 $f_T$  - temperature coefficient (see page 607),  
 $f_C$  - contact coefficient (see page 607).

The lifespan of a linear bushing in hours can be obtained by calculating the travelling distance per unit time.

The lifespan can be obtained from the following equation if the stroke length and the number of strokes are constant:

$$L_h = \left( \frac{L \times 10^3}{2 \times l_s \times n_1 \times 60} \right)$$

where:

- $L_h$  - lifespan, hr,  
 $l_s$  - stroke length, m,  
L - rated life, km,  
 $n_1$  - number of strokes per minute, cpm.

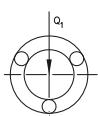
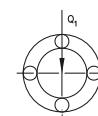
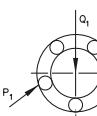
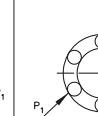
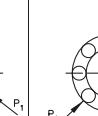
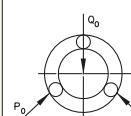
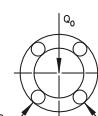
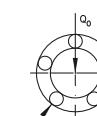
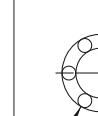
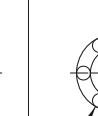
### Relation between ball circuits and load rating

The URB linear bushing includes ball circuits that are spaced equally and circumferentially. The load rating varies according to the loaded position on the circumference.

URB

The value in the dimension table indicates the load rating when the load is placed on top of one ball circuit. If the URB linear bushing is used with

two ball circuits loaded uniformly, the load rating will be greater. The following table shows the values by the number of ball circuits in such cases:

Table 6					
Row position load ratio	Number of rows				
	3	4	5	6	8
Row position load ratio					
	$Q_1 = P_0$	$Q_1 = P_0$	$Q_1 = 1,106P_0$	$Q_1 = 1,1354P_0$	$Q_1 = 1,841P_0$
Row position					
	$Q_0 = P_0$	$Q_0 = 1,414P_0$	$Q_0 = 1,618P_0$	$Q_0 = 1,732P_0$	$Q_0 = 2,052P_0$
Load ratio	$Q_0/Q_1 = 1$	$Q_0/Q_1 = 1,414$	$Q_0/Q_1 = 1,463$	$Q_0/Q_1 = 1,280$	$Q_0/Q_1 = 1,115$

## Sample calculations

Obtaining the rated life and lifespan the URB linear bushing used in the following conditions:

Linear bushing	LM20
Stroke lenght	50 mm
Number of strokes per minute	50 cpm
Load per bush	490 N

The basic dynamic load rating of the linear bushing is 882N from the dimension table. From equation (1) therefore, the rated life is obtained as follows:

$$L = \left( \frac{f_H \times f_T \times f_C}{f_W \times P} \times \frac{C}{P} \right)^3 \times 50 = \left( \frac{882}{490} \right)^3 \times 50 = 292 \text{ km},$$

where:

$$f_H = f_T = f_C = f_W = 1.0$$

From equation (2), the lifespan is obtained as follows:

$$L_h = \left( \frac{L \times 10^3}{2 \times l_s \times n_1 \times 60} \right) = \left( \frac{292 \times 10^3}{2 \times 0,05 \times 50 \times 60} \right) = 973 \text{ hr}$$

Selecting the linear bushing type satisfying the following conditions:

Number of linear bushing used	4
Stroke lenght	1 m
Traveling speed	10 m/min
Number of strokes per minute	5 cpm
Lifespan	10 hr
Total load	980 N

From equation (2), the travelling distance within the lifespan is obtained as follows

$$L = 2 \times l_s \times n_1 \times 60 \times L_h = 6000 \text{ km}$$

From equation (1), the basic dynamic load rating is obtained as follows:

$$C = \sqrt[3]{\frac{L}{50}} \times \left( \frac{f_W}{f_H + f_T + f_C} \right) \times P = 1492 \text{ N}$$

Assume the following with a pair of shafts each with two linear bushing:

$$f_C = 0,81, f_W = f_T = f_H = 1$$

As a result, LM30 is selected from the dimension table as the URB linear bushing type satisfying the value of C.

## Clearance and fit

When a standard-type URB linear bushing is used with a shaft, inadequate clearance, adjustment may cause early bush failure and/or poor, rough traveling.

The clearance adjustable linear bush and open linear bush can be clearance adjusted when assembled in the housing which can control the outside cylinder diameter. However, too much clearance adjustment increases the deformation of the outside cylinder, to affect its precision and life. Therefore, the appropriate clearance between the bush and shaft, and clearance between the bush and housing are required according to the application. Table 7 shows recommended fit of the bush:

Division	Table 7			
	Shaft	Housing		
Model	Normal fit	Transitional	Loose fit	Tight fit
High class				
LM	g6	h6	H7	J7
LMB				
LME	h6	j6	H7	J7

Note. The clearance may be zero or negative.  
Please attention the movement.

## Shaft and housing

To optimize performance of the URB linear bushing high precision of the shaft and housing is required.

### Shaft

The rolling balls in the URB linear bushing are in point contact with the shaft surface. Therefore, the shaft dimensions, tolerance, surface finish and hardness greatly affect the travelling performance of the bush. The shaft should be manufactured with due attention to the following points:

- Since the surface finish critically affects smooth rolling of balls, grind the shaft at 1,5 S or better.
- The best hardness of the shaft is HRC 60 to 64; Hardness less than HRC 60 decreases the life considerably, and hence reduces the permissible load. On the other hand, hardness over HRC 64 accelerates ball wear.
- The shaft diameter for the clearance adjustable linear bush and open linear bush should as much as possible be of the lower value of the inscribed

circle diameter in the specification table. Do not set the shaft diameter to the upper value.

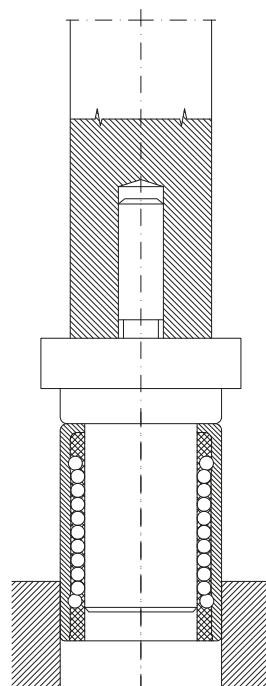
- Zero clearance or negative clearance increases the frictional resistance slightly. If the negative clearance is too tight, the deformation of the outside cylinder will become larger, to shorten the bush life.

### Housing

There is a wide range of housing differing in design, machining and mounting. For the fitness and shapes of housing see in table 8 and the following section on mounting.

## Mounting

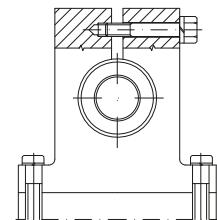
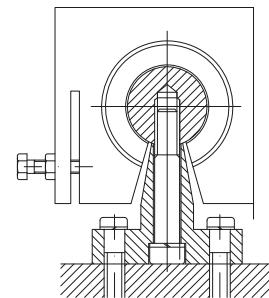
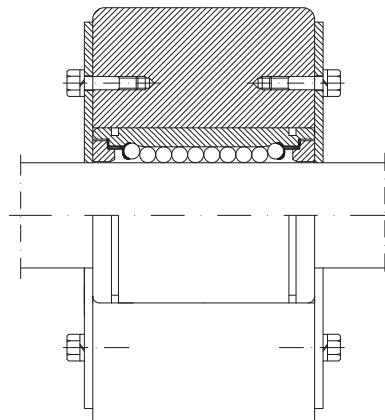
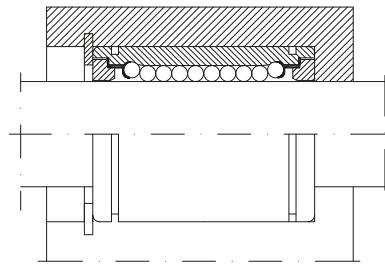
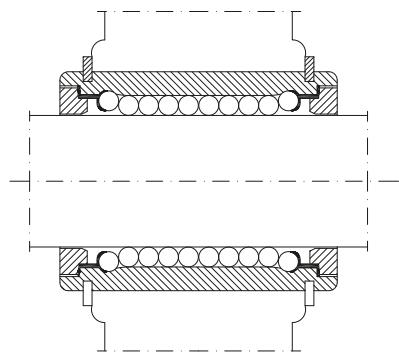
When inserting the linear bush into the bushing do not hit the linear bush on the side ring holding the retainer but apply the cylinder circumference with a proper jig and push the linear bush into the housing by hand or lightly knock it in. In inserting the shaft after mounting the bush, be careful not to shock the balls. Note that if two shafts are used in parallel, the parallelism is the most important factor to assure the smooth linear movement. Take care in setting the shafts.



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## Exemples of mounting

The popular way to mount a linear bush is to operate it with an appropriate interference. It is recommended, however, to make a loose fit in principle because otherwise precision is apt to be minimized. The following examples show assembling of the inserted bush in terms of designing and mounting for reference.



## **URB ball bushing interchangeability list**

### **Ball bushing compact type**

<b>URB</b>	<b>NTN</b>	<b>STAR</b>	<b>INA</b>	<b>SKF</b>	<b>FAG</b>
KH...	KH...	0658 - 0... -00	KH...	LBBR...	LNA...
				LBBS...	LFA
KH... PP	KH...LL	0658 - 2... -40	KN...PP	LBBR...2LS	LNA...2RS
				LBBS...2LS	LFA...2RS

### **Ball bushing resin retainer**

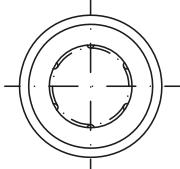
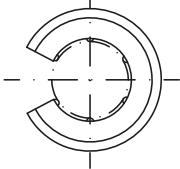
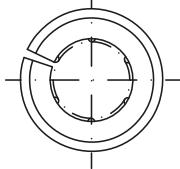
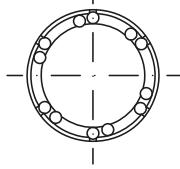
<b>URB</b>	<b>NB</b>	<b>INA</b>	<b>SKF</b>	<b>THK</b>	<b>IKO</b>	<b>THOMSON</b>	<b>EASE</b>
LME	KB...G	KB	LBAR/LBCR	LME...	LBE...	MA M...	SDE
LME...UU	KB...GUU	KB...PP	LBAR/LBCR...2LS	LME...UU	LBE...UU	MA M...WW	SDE...UU
LME...AJ	KB...GAJ	KBS...	LBAS...	LME...AJ	LBE...AJ	MA M...ADJ	SDE...AJ
LME...UUAJ	KB...GUUAJ	KBS...PP	LBAS...2LS	LME...UUAJ	LBE...UUAJ	MA M...ADJ WW	SDE...UUAJ
LME...OP	KB...GOP	KBO...	LBAT/LBCT...	LME...OP	LBE...OP	MA M...OPN	SDE...OP
LME...UUOP	KB...GUUOP	KBO...PP	LBAT/LBCT...2LS	LME...UUOP	LBE...UUOP	MA M...OPN WW	SDE...UUOP

The above types are metric dimension series generally used in Europe.

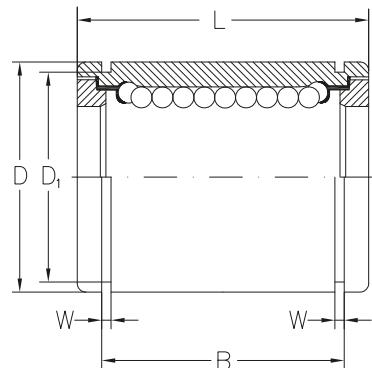
<b>URB</b>	<b>NB</b>	<b>THK</b>	<b>EASE</b>	<b>URB</b>	<b>NB</b>	<b>THK</b>	<b>EASE</b>
LM	SM...G	LM...	SDM	LMB	SW...G	LMB...	SDB
LM...UU	SM...GUU	LM...UU	SDM...UU	LMB...UU	SW...GUU	LMB...UU	SDB...UU
LM...AJ	SM...GAJ	LM...AJ	SDM...AJ	LMB...AJ	SW...GAJ	LMB...AJ	SDB...AJ
LM...UUAJ	SM...GUUAJ	LM...UUAJ	SDM...UUAJ	LMB...UUAJ	SW...GUUAJ	LMB...UUAJ	SDB...UUAJ
LM...OP	SM...GOP	LM...OP	SDM...OP	LMB...OP	SW...GOP	LMB...OP	SDB...OP
LM...UUOP	SM...GUUOP	LM...UUOP	SDM...UUOP	LMB...UUOP	SW...GUUOP	LMB...UUOP	SDB...UUOP

The above types are metric dimension series generally used in Japan and other countries.

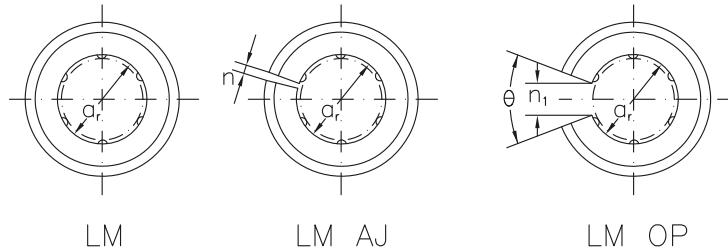
The above types are inch dimension series generally used in US.

Standard type		page 615 - 620	
Open type		page 615 - 620	One ball circuit ( $50^\circ - 80^\circ$ ) is removed to allow an opening slot to fit over rail supports.
Adjustable type		page 615 - 620	This type has a slot in the outside cylinder. This design allows for clearance adjustment.
Drawn cup type		page 621	This type linear ball bushing consist of thin walled drawn cups, plastic cages and grade 10 steel balls. Bushings are available with seals at one or both ends.

## Linear ball bushing



Nominal part no.						Nominal shaft diameter
Standard type	Seal type	Ball circuit	Mass	Adjustable type	Open type	Tolerance
-	-		gr	-	-	mm
<b>LM5</b>	<b>LM5 UU</b>	4	4	-	-	5 <sup>0</sup> -0,008
<b>LM6</b>	<b>LM6 UU</b>	4	8	<b>LM6 AJ</b>	-	6 <sup>0</sup> -0,009
<b>LM8 S</b>	<b>LM8 SUU</b>	4	11	<b>LM8 SAJ</b>	-	8
<b>LM8</b>	<b>LM8 UU</b>	4	16	<b>LM8 AJ</b>	-	8
<b>LM10</b>	<b>LM10 UU</b>	4	30	<b>LM10 AJ</b>	-	10
<b>LM12</b>	<b>LM12 UU</b>	4	31,5	<b>LM12 AJ</b>	<b>LM12 OP</b>	12
<b>LM13</b>	<b>LM13 UU</b>	4	43	<b>LM13 AJ</b>	<b>LM13 OP</b>	13
<b>LM16</b>	<b>LM16 UU</b>	4	69	<b>LM16 AJ</b>	<b>LM16 OP</b>	16
<b>LM20</b>	<b>LM20 UU</b>	5	87	<b>LM20 AJ</b>	<b>LM20 OP</b>	20 <sup>0</sup> -0,010
<b>LM25</b>	<b>LM25 UU</b>	6	220	<b>LM25 AJ</b>	<b>LM25 OP</b>	25
<b>LM30</b>	<b>LM30 UU</b>	6	250	<b>LM30 AJ</b>	<b>LM30 OP</b>	30
<b>LM35</b>	<b>LM35 UU</b>	6	390	<b>LM35 AJ</b>	<b>LM35 OP</b>	35 <sup>0</sup> -0,012
<b>LM40</b>	<b>LM40 UU</b>	6	585	<b>LM40 AJ</b>	<b>LM40 OP</b>	40
<b>LM50</b>	<b>LM50 UU</b>	6	1580	<b>LM50 AJ</b>	<b>LM50 OP</b>	50
<b>LM60</b>	<b>LM60 UU</b>	6	2000	<b>LM60 AJ</b>	<b>LM60 OP</b>	60 <sup>0</sup> -0,015



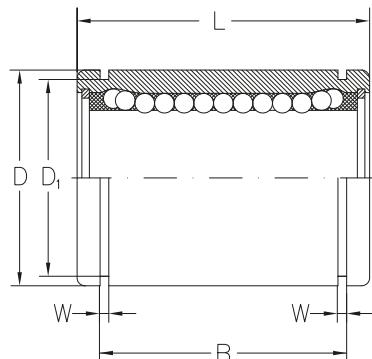
#### Major dimensions and tolerance

D <sub>Tolerance</sub>	L <sub>Tolerance</sub>	B <sub>Tolerance</sub>	W	D1	H	h1	Eccen- tricity max	Radial clearance max	Basic load C	Rating C <sub>0</sub>	Nominal part no.	
mm							μm		kN			
10 <sup>0</sup> <sub>-0,009</sub>	15 <sup>0</sup> <sub>-0,012</sub>	10,2 <sup>0</sup> <sub>-0,2</sub>	1,1	9,6	-	-	8	-3	0,17	0,21	<b>LM5</b>	
12 <sup>0</sup> <sub>-0,011</sub>	19 <sup>0</sup> <sub>-0,02</sub>	13,5 <sup>0</sup> <sub>-0,2</sub>	1,1	11,5	1	-	12	-5	0,21	0,27	<b>LM6</b>	
15 <sup>0</sup> <sub>-0,011</sub>	17 <sup>0</sup> <sub>-0,02</sub>	11,5 <sup>0</sup> <sub>-0,2</sub>	1,1	14,3	1	-	12	-5	0,18	0,23	<b>LM8S</b>	
15 <sup>0</sup> <sub>-0,011</sub>	24 <sup>0</sup> <sub>-0,02</sub>	17,5 <sup>0</sup> <sub>-0,2</sub>	1,1	14,3	1	-	12	-5	0,27	0,41	<b>LM8</b>	
19 <sup>0</sup> <sub>-0,013</sub>	29 <sup>0</sup> <sub>-0,02</sub>	22 <sup>0</sup> <sub>-0,2</sub>	1,3	18	1	-	12	-5	0,38	0,56	<b>LM10</b>	
21 <sup>0</sup> <sub>-0,013</sub>	30 <sup>0</sup> <sub>-0,02</sub>	23 <sup>0</sup> <sub>-0,2</sub>	1,3	20	1,5	8	80°	12	-5	0,42	0,61	<b>LM12</b>
23 <sup>0</sup> <sub>-0,013</sub>	32 <sup>0</sup> <sub>-0,02</sub>	23 <sup>0</sup> <sub>-0,2</sub>	1,3	22	1,5	9	80°	12	-7	0,52	0,79	<b>LM13</b>
28 <sup>0</sup> <sub>-0,013</sub>	37 <sup>0</sup> <sub>-0,02</sub>	26,5 <sup>0</sup> <sub>-0,2</sub>	1,6	27	1,5	11	80°	12	-7	0,79	1,2	<b>LM16</b>
32 <sup>0</sup> <sub>-0,016</sub>	42 <sup>0</sup> <sub>-0,02</sub>	30,5 <sup>0</sup> <sub>-0,2</sub>	1,6	30,5	1,5	11	60°	15	-9	0,88	1,4	<b>LM20</b>
40 <sup>0</sup> <sub>-0,016</sub>	59 <sup>0</sup> <sub>-0,03</sub>	41 <sup>0</sup> <sub>-0,3</sub>	1,85	38	2	12	50°	15	-9	1	1,6	<b>LM25</b>
45 <sup>0</sup> <sub>-0,016</sub>	64 <sup>0</sup> <sub>-0,03</sub>	44,5 <sup>0</sup> <sub>-0,3</sub>	1,85	43	2,5	15	50°	15	-9	1,6	2,8	<b>LM30</b>
52 <sup>0</sup> <sub>-0,019</sub>	70 <sup>0</sup> <sub>-0,03</sub>	49,5 <sup>0</sup> <sub>-0,3</sub>	2,1	49	2,5	17	50°	20	-13	1,7	3,2	<b>LM35</b>
60 <sup>0</sup> <sub>-0,019</sub>	80 <sup>0</sup> <sub>-0,03</sub>	60,5 <sup>0</sup> <sub>-0,3</sub>	2,1	57	3	20	50°	20	-13	2,2	4,1	<b>LM40</b>
70 <sup>0</sup> <sub>-0,022</sub>	100 <sup>0</sup> <sub>-0,03</sub>	74 <sup>0</sup> <sub>-0,3</sub>	2,6	76,5	3	25	50°	20	-13	3,9	8,1	<b>LM50</b>
80 <sup>0</sup> <sub>-0,022</sub>	110 <sup>0</sup> <sub>-0,03</sub>	85 <sup>0</sup> <sub>-0,3</sub>	3,15	86,5	3	30	50°	25	-16	4,8	10,2	<b>LM60</b>

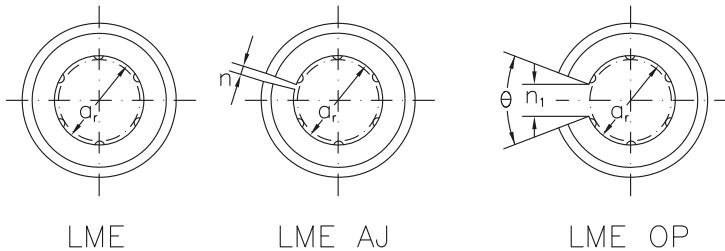
LM < Built-in synthetics resin retainers >

This type is a metric dimension series widely used in Japan and other countries.

## Linear ball bushing



Nominal part no.						Nominal shaft diameter
Standard type	Seal type	Ball circuit	Mass	Adjustable type	Open type	Tolerance
-	-		gr	-	-	mm
LME5	LME5 UU	3	11	LME5 AJ	-	5 <sup>+0,008</sup> <sub>0</sub>
LME8	LME8 UU	4	20	LME8 AJ	-	8
LME12	LME12 UU	4	41	LME12 AJ	LME12 OP	12
LME16	LME16 UU	4	57	LME16 AJ	LME16 OP	16 <sup>+0,009</sup> <sub>-0,001</sub>
LME20	LME20 UU	5	91	LME20 AJ	LME20 OP	20
LME25	LME25 UU	6	215	LME25 AJ	LME25 OP	25 <sup>+0,011</sup> <sub>-0,001</sub>
LME30	LME30 UU	6	325	LME30 AJ	LME30 OP	30
LME40	LME40 UU	6	705	LME40 AJ	LME40 OP	40 <sup>+0,013</sup> <sub>-0,002</sub>
LME50	LME50 UU	6	1130	LME50 AJ	LME50 OP	50
LME60	LME60 UU	6	2220	LME60 AJ	LME60 OP	60

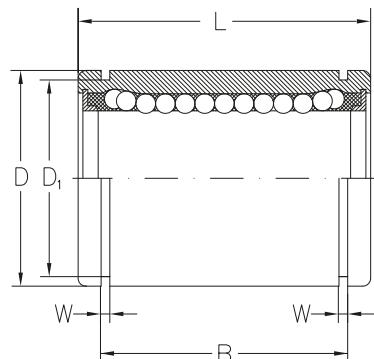


#### Major dimensions and tolerance

$D_{\text{Tolerance}}$	$L_{\text{Tolerance}}$	$B_{\text{Tolerance}}$	W	D1	H	h1	Eccen- tricity max	Radial clearance max	Basic load $C$	Rating $C_0$	Nominal part no.	
mm							μm	kgF				
12 <sup>0</sup> -0,008	22 <sup>0</sup> -0,02	14,5 <sup>0</sup> -0,2	1,1	11,5	1	-	12	-5	21	27	<b>LME5</b>	
16 <sup>0</sup> -0,008	25 <sup>0</sup> -0,02	16,5 <sup>0</sup> -0,2	1,1	15,2	1	-	12	-5	21	41	<b>LME8</b>	
22 <sup>0</sup> -0,009	32 <sup>0</sup> -0,02	22,9 <sup>0</sup> -0,2	1,3	21	1,5	7,5	78°	12	-7	52	79	<b>LME12</b>
26 <sup>0</sup> -0,009	36 <sup>0</sup> -0,02	24,9 <sup>0</sup> -0,2	1,3	24,9	1,5	10	78°	12	-7	59	91	<b>LME16</b>
32 <sup>0</sup> -0,011	45 <sup>0</sup> -0,02	31,5 <sup>0</sup> -0,2	1,6	30,3	2	10	60°	15	-9	88	140	<b>LME20</b>
40 <sup>0</sup> -0,011	58 <sup>0</sup> -0,03	44,1 <sup>0</sup> -0,3	1,85	37,5	2	12,5	60°	15	-9	100	160	<b>LME25</b>
47 <sup>0</sup> -0,011	68 <sup>0</sup> -0,03	52,1 <sup>0</sup> -0,3	1,85	44,5	2	12,5	50°	15	-9	160	280	<b>LME30</b>
62 <sup>0</sup> -0,013	80 <sup>0</sup> -0,03	60,6 <sup>0</sup> -0,3	2,15	59	3	16,8	50°	17	-13	220	410	<b>LME40</b>
75 <sup>0</sup> -0,013	100 <sup>0</sup> -0,03	77,6 <sup>0</sup> -0,3	2,65	72	3	21	50°	17	-13	390	810	<b>LME50</b>
90 <sup>0</sup> -0,015	125 <sup>0</sup> -0,04	101,7 <sup>0</sup> -0,4	3,15	86,5	3	27,2	54°	20	-13	480	1020	<b>LME60</b>

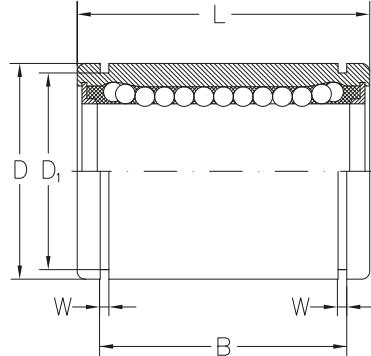
LM < Built-in synthetics resin retainers >  
This type is a metric dimension series generally used in Europe.

## Linear ball bushing



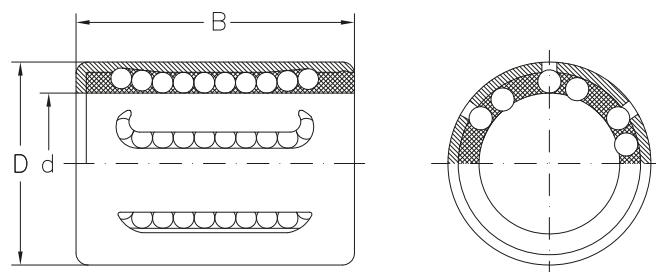
Nominal diameter	Nominal part no.						Nominal shaft diameter	Major dimensions and tolerance	
	Standard type	Seal type	Ball circuit	Mass	Adjustable type	Open type		Tolerance	D <sub>Tolerance</sub>
inch/mm	-	-	kg	-	-	-	inch/mm		
1/4 6,350	LMB4	LMB4 UU	4	0,008	LMB4 AJ	-	0,250 6,350	0 -0,0040	0,5000 12,700
								0 -0,011	
3/8 9,525	LMB6	LMB6 UU	4	0,014	LMB6 AJ	-	0,3750 9,525	0,6250 15,875	0 -0,00050
1/2 12,700	LMB8	LMB8 UU	4	0,037	LMB8 AJ	LMB8 OP	0,5000 12,700	0 -0,0090	0,8750 22,225
5/8 15,875	LMB10	LMB10 UU	4	0,076	LMB10 AJ	LMB10 OP	0,625 15,875	1,1250 28,575	
3/4 19,050	LMB12	LMB12 UU	5	0,095	LMB12 AJ	LMB12 OP	0,7500 19,050	1,2500 -0,0040	0 31,750
1 25,400	LMB16	LMB16 UU	6	0,200	LMB16 AJ	LMB16 OP	1,0000 25,400	1,5625 39,688	
1-1/4 31,750	LMB20	LMB20 UU	6	0,440	LMB20 AJ	LMB20 OP	1,2500 31,750	2,0000 -0,0050	0 50,800
1-1/2 38,000	LMB24	LMB24 UU	6	0,670	LMB24 AJ	LMB24 OP	1,5000 38,100	2,3750 60,325	0 -0,019
2 50,800	LMB32	LMB32 UU	6	0,114	LMB32 AJ	LMB32 OP	2,0000 50,800	3,0000 -0,0010	0 76,200
								0 -0,022	

LM < Built-in synthetics resin retainers >  
This type is a metric dimension series widely used in Japan and other countries



L	Tolerance	B	Tolerance	W	D1	h	h1	$\theta$	Eccen-		Radial	Basic load	Nominal	
									tricity	clearance			part no.	
inch/mm														
0,7500 19,050	0 -0,008	0,5110 12,98	0 -0,008	0,390 0,992	0,4687 11,906	0,04 1	-	-	0,0005 12	-0,0001 -3		206 265	LMB4	
0 -0,200	0 -0,200													
0,8750 22,225	0,6358 16,15		0,390 0,992	0,5880 14,935	0,04 1	-	-	-	0,0005 12	-0,0001 -3		225 314	LMB6	
1,2500 31,750	0,9625 24,46		0,0459 1,168	0,8209 20,853	0,06 1,5	0,34 7,9375	80° 12	-4	0,0005 510	-0,0001 764			LMB8	
1,5000 38,100	1,1039 28,04		0,0559 1,422	1,0590 26,899	0,06 1,5	0,375 9,525	80° 12	-4	0,0005 774	-0,0001 1180			LMB10	
1,6250 41,275	1,1657 29,61		0,0559 1,422	1,1760 29,870	0,06 1,5	0,4375 11,1125	60° 15	-6	0,0006 862	-0,0002 1370			LMB12	
2,2500 57,150	0 -0,012	1,7547 44,57	0 -0,012	0,0679 1,727	1,4687 37,306	0,06 1,5	0,5625 14,2875	50° 15	-6	0,0006 980	-0,0002 1570			LMB16
2,6250 66,675	0 -0,300	2,0047 50,92	0 -0,300	0,0679 1,727	1,8859 47,904	0,10 2,5	0,625 15,875	50° 20	-8	0,0008 1570	-0,0003 2740			LMB20
3,000 76,200	2,4118 61,26		0,0859 2,184	2,2389 56,870	0,12 3	0,75 19,05	50° 20	-8	0,0008 2180	-0,0003 4020			LMB24	
4,000 101,600	3,1917 81,07		0,1029 2,616	2,8379 72,085	0,12 3	1,0 25,40	50° 25	-13	0,0010 3820	-0,0005 7940			LMB32	
0 -0,022														

## Standard linear ball bushing Steel drawn cup/cage plastic



Dimensions			Load capacity		Designation	Mass
d	D	B	dyn.	stat.	bearing	
<b>mm</b>						<b>g</b>
<b>6</b>	12	22	400	239	<b>KH0622</b>	7
<b>8</b>	15	24	435	280	<b>KH0824</b>	12
<b>10</b>	17	26	500	370	<b>KH1026</b>	14,5
<b>12</b>	19	28	620	510	<b>KH1228</b>	18,5
<b>14</b>	21	28	620	520	<b>KH1428</b>	20,5
<b>16</b>	24	30	800	620	<b>KH1630</b>	27,5
<b>20</b>	28	30	950	790	<b>KH2030</b>	32,5
<b>25</b>	35	40	1990	1670	<b>KH2540</b>	66
<b>30</b>	40	50	2800	2700	<b>KH3050</b>	95
<b>40</b>	52	60	4400	4450	<b>KH4060</b>	182
<b>50</b>	62	70	5500	6300	<b>KH5070</b>	252

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

622



623

URB

# Pillow blocks

## Feature

The spherical outside surface ball bearings of URB are deep groove ball bearings with wide and narrow inner rings, consisting of insert bearings (SA200, SB200, UC200, UEL200, UK200, UCX00 and UC300) and various housing. The type of bearing units are defined according to the different mounting methods of the bearings to shafts: the set-screws type, the adapter type, the eccentric locking collar type.

The URB housing are mainly casting housing. There are pressed steel plate housing as well align with ease during operation and can be conveniently mounted or dismounted.

The bearing units can operate satisfactorily under working conditions, especially for machines operating in dusty or muddy surroundings. Thus, they are widely used in agricultural, construction and transmission machineries, etc.

There are various types of sealing devices for our products, such as synthetic rubber seals, slinger with synthetic rubber seals and triple lip seals etc.

Sufficient lubricating grease has been put into the bearing during manufacturing, which can act as lubricating as well as rust proof. No more grease is needed to put in during the lubricating period when the bearings operate under normal conditions. Lubricating grease can be added from the fittings when the relubricate bearings operate under hard conditions.

The outer ring of the bearing, has spherical outside surface which can be fitted to the concave spherical surface of the housing, and the fit between them can be clearance fit or interference fit according to different conditions. This combination provides self-alignment between the self-contained bearing and the housing, and compensates for a certain alignment errors or flexing of the shaft when the bearing is in operation. This definitely increases the bearing service life.

## Lubrication

The Spherical Outside Surface Ball Bearings of URB generally use CG-2 rust proof lithium based lubricating grease, with physical chemical properties shown in the following table 1. Grease is filled in the spherical outside surface ball bearings during manufacturing.

Static safety factors		
<b>Density 1/mm</b>		
Without operation	268	
Operated 60 times	260	
<b>Dropping point °C</b>		
	128	
<b>Mechanical impurities pc/gr</b>		
10-25 µm	within 1000	
25-75 µm	within 500	
above 75 µm	0	
<b>Base oil kinematical viscosity 40° cst</b>		
	80,3	

The bearings usually operate below the temperature of 120°C (the measuring temperature of the outer rings is 100°C). Grease life reduction has to be taken into account when the bearing continues to operate at a temperature should not be lower than -30°C.

The permissible speed of rotation is connected with the fit between shaft and bearing. It is reconnected with the fit between shaft and bearing. It is recommended that, under normal operating conditions, the fit between the bearing and the shaft is h7. Looser fit allowing lower speed is recommended when heavier load is applied.

## Tolerance for bearing units

**Tolerances on inner rings of bearing with cylindrical bore**  
Unit: 0.001 mm

Table 2

Nominal bore diameter	Cylindrical bore						Radial run-out	
	d over	incl.	bore diameter dm deviations high	low	d deviations high	low	width Bi deviations high	low
<b>mm</b>								
10	18	+18	0	+22	-4	0	-120	12
18	30	+21	0	+25	-4	0	-120	15
30	50	+25	0	+30	-5	0	-120	18
50	80	+30	0	+36	-6	0	-150	22
80	120	+35	0	+42	-7	0	-200	28
120	150	+40	0	+48	-8	0	-250	35

Note: dm is defined as the arithmetical mean of the largest and smallest diameter obtained by two-point measurements.

**Tolerances on inner rings of bearings with tapered bore**  
Unit: 0.001 mm

Please refer to the figures 1.

Table 3

Nominal bore diameter	$\Delta d$	$\Delta d_1 - \Delta d$		
d over	incl.	deviations high	low	max. min.
<b>mm</b>				
18	30	+33	0	+21 0
30	50	+39	0	+25 0
50	80	+46	0	+30 0
80	120	+54	0	+35 0
120	150	+63	0	+40 0

Note: The deviation from nominal taper are defined by the limits of ( $\Delta d_1 - \Delta d$ ), where  $\Delta d_1$  is actual deviations of  $d_1$  from nominal diameter at the largest end of bore and  $\Delta d$  is actual deviation of  $d$  from bearing bore nominal diameter.

$d_1$  is obtained by the following formula:  
 $d_1 = d + 0.08333 B$ , where  $B$  is width of the bearing inner ring.

The nominal taper angle =  $2^\circ 23'9.4''$ .

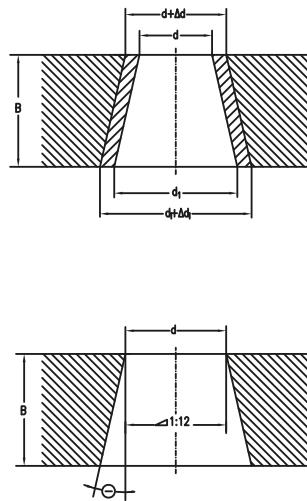


Fig. 1

Tolerances on outer ring Unit: 0.001 mm				
Nominal bore diameter	D <sub>m</sub>	Radial run-out		
D over	incl.	deviations	high	low
mm				
<b>40</b>	50	0	-11	20
<b>50</b>	80	0	-13	25
<b>80</b>	120	0	-15	35
<b>120</b>	150	0	-18	40
<b>150</b>	160	0	-25	45

Table 4

Note: D<sub>m</sub> is defined as the arithmetical means of the largest and the smallest diameter obtained by two-point measurement.

The low deviation of outside diameter D<sub>m</sub> does not apply within the distance of 1/4 the width of outer ring from the sides.

#### Chamfer dimensions

Table 6

Nominal dimensions	r max.	r min.
mm		
<b>1</b>	1.5	0.6
<b>1.5</b>	2	1
<b>2</b>	2.5	1.5
<b>2.5</b>	3	2
<b>3</b>	3.5	2.5
<b>3.5</b>	4	3
<b>4</b>	4.5	3.5
<b>5</b>	6	4

Please refer to the figures 3.

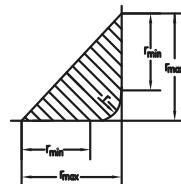


Fig. 3

Tolerance for distance "h" between the radial plane passing through center of outer ring and a side of inner ring Unit: 0.001 mm		
Nominal bore diameter	n	
mm		
<b>40</b>	50	± 200
<b>50</b>	80	± 250
<b>80</b>	120	± 300
<b>120</b>	160	± 350

Table 5

Please refer to the figures 2.

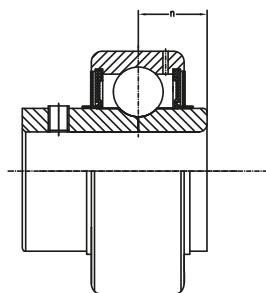


Fig. 2

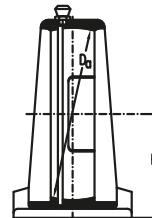


Fig. 4

### Tolerances for flaged type housing (F, FS, FL, FT, FA, FB, FC)

Please refer below figures 5a, 5b and table 8a, 8b.

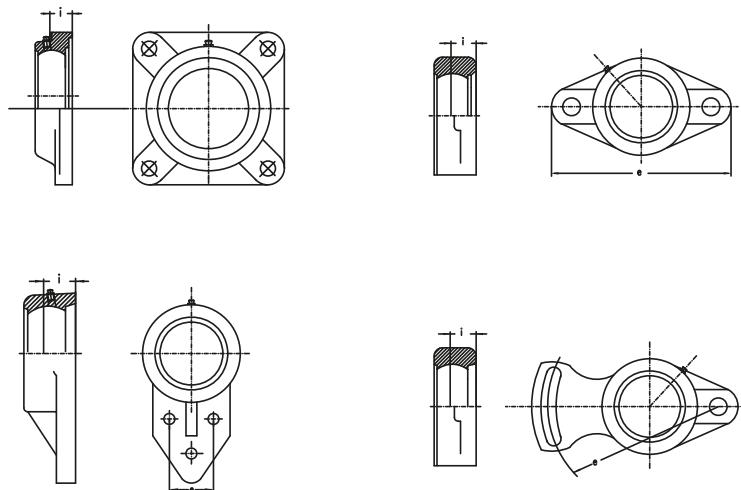


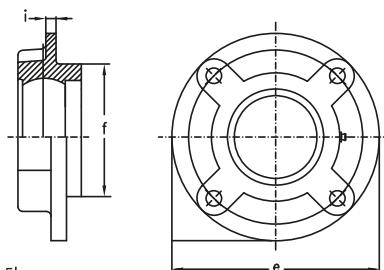
Fig. 5a

### Tolerances for flanged type housings (F, FS, FL, FT, FA, FB) Center height tolerances for pillow block type housings Unit: 0.001 mm

Table 7

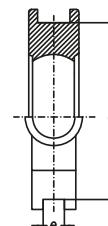
Housing number				<b>h</b> deviations
<b>mm</b>				
P203		AK204		
P204		AK205	PA203	
P205		AK206	PA204	PH204
P206	PX05	P305	AK207	PA205
P207	PX06	P306	AK208	PA206
P208	PX07	P307	AK209	PA207
P209	PX08	P308	AK210	PA208
P210	PX09	P309	AK211	PA209
P211	PX10	P310	AK212	PA210
P212	PX11	P311	AK213	PA211
P213	PX12	P312	AK214	PA212
P214	PX13	P313	AK215	PA213
P215	PX14	P314		PH214
P216	PX15	P315		PH215
P217	PX16	P316		±200
P218				PH216

Unit: 0.001 mm						Table 8a	
Housing number						e deviations	i deviations
mm							
F204	FL204	FT204	FS204	FA204	FB204		
F205	F305	FL205	FL305	FT205	FS205	FA205	FB205
F206	F306	FL206	FL306	FT206	FS206	FA206	FB206
F207	F307	FL207	FL307	FT207	FS207	FA207	FB207
F208	F308	FL208	FL308	FT208	FS208	FA208	FB208
F209	F309	FL209	FL309	FT209	FS209	FA209	FB209
F210	F310	FL210	FL310	FT210	FS210	FA210	FB210
F211	F311	FL211	FL311	FT211	FS211	FA211	FB211
F212	F312	FL212	FL312	FT212	FS212	FA212	FB212
F213	F313	FL213	FL313	FT213	FS213	FA213	FB213
F214	F314	FL214	FL314	FT214	FS214		
F215	F315	FL215	FL315		FS215		±1000
F216		FL216					±800
F217		FL217					
F218		FL218					



#### Tolerance for take-up type housing (T,ST)

Please refer to below figure 6 and table 9a, 9b.



Tolerance for flaged type housing (FC)						Table 8b	
Housing number	f	e	i	Radial run-out	of machined pilot	max	
	deviations	deviations	deviations				
	high	low					
FC 204							
FC 205	0	-46					
FC 206							
FC 207		± 700	± 500	200			
FC 208							
FC 209	0	-54					
FC 210							
FC 211							
FC 212							
FC 213							
FC 214							
FC 215	0	-63	± 1000	± 800	300		
FC 216							
FC 217							
FC 218	0	-72					

Tolerances for take-up type housing (T)				Table 9a	
Housing number	k deviations	e deviations	Parallelism of guide		
	high	low	max		
T204	+200	0	500		
T210	0	-500			
T211	+300	0	600		
T217	0	-800			

<b>Tolerances for take-up type housing (ST)</b>				
<b>Unit: 0.001 mm</b>				
Housing number	k deviations high	e deviations low	Parallelism of guide max	
mm				Table 9b
ST204	+500	± 250	500	
ST210	-250			
ST211	+1000	± 250	600	
ST215	-250			

Note:

$$D_{am} = (D_a \text{ max} + D_a \text{ min}) / 2$$

Da max - maximum measured value of Da

Da min - minimum measured value of Da

Dimensional tolerances for spherical inside diameter of housing are classified as H7 for clearance fit and J7 for interference fit.

As the self - contained for bearings are equipped with locking-pin, clearance fit H7 is normally applied.

<b>Tolerances on spherical inside diameter</b>										Table 10
<b>Unit: 0.001 mm</b>										
Nominal spherical	Symbol H7			Symbol J7						Table 10
inside diameter										
D <sub>a</sub>	D <sub>am</sub> deviations over incl. high	D <sub>a</sub> deviations low	D <sub>a</sub> deviations high	D <sub>a</sub> deviations low	D <sub>am</sub> high	D <sub>a</sub> deviations low	D <sub>a</sub> high	D <sub>a</sub> low		
mm										
30	50	+25	0	+30	-5	+14	-11	+19	-16	
50	80	+30	0	+36	-6	+18	-12	+24	-18	
80	120	+35	0	+42	-7	+22	-13	+29	-20	
120	180	+40	0	+48	-8	+26	-14	+34	-22	
180	250	+46	0	+55	-9	+30	-16	+39	-25	

<b>Machining tolerances</b>		
Table 11		
Nominal dimension	Dimensional tolerance	
over incl.		
mm		
4	16	± 0,2
16	63	± 0,3
63	250	± 0,5

<b>Casting tolerances on thickness</b>		
Table 13		
Nominal dimension	Dimensional tolerance	
over incl.		
mm		
up	5	± 1
5	10	± 1,5
10	20	± 2
20	30	± 3
30	50	± 3,5

<b>Casting tolerances on lenght</b>		
Table 12		
Nominal dimension	Dimensional tolerance	
over incl.		
mm		
up	100	± 1,5
100	200	± 2,0
200	400	± 3,0
400	800	± 4,0

<b>One side machining tolerances</b>		
Table 14		
Nominal dimension	Dimensional tolerance	
over incl.		
mm		
up	5	± 1
5	100	± 1,5
100	200	± 2
200	400	± 3

## Note:

Dimensional tolerances and deviations are for ordinary grade;

Dimensional tolerances on lenght and thickness may be added with deviations on draft taper.

## Radial internal clearance of bearings

The radial internal clearance of the bearing for the unit is the same as the value of ISO 5753, the internal radial clearance for the spherical outside

surface ball bearing is usually greater than that for the same size of deep groove ball bearing. The clearance for the cylindrical bore bearing is shown in table 15, while the clearance for the tapered bore bearing is shown in table 16.

Radial internal clearance of cylindrical bore bearings (with set-screws and eccentric locking collar)							
Unit: 0,001 mm							
Nominal bore diameter		Clearance symbol					
d over	incl.	C2 min.	max.	normal min.	max.	c3 min.	max.
<b>mm</b>							
10	18	3	18	10	25	18	33
18	24	5	20	12	28	20	36
24	30	5	20	12	28	23	41
30	40	6	20	13	33	28	46
40	50	6	23	14	36	30	51
50	65	8	28	18	43	38	61
65	80	10	30	20	51	46	71
80	100	12	36	24	58	53	84
100	120	15	41	28	66	61	97
120	140	18	48	33	88	71	114

Table 15

Radial internal clearance of tapered bore bearings (with adapter sleeve)							
Unit: 0,001 mm							
Nominal bore diameter		Clearance symbol					
d over	incl.	C2 min.	max.	normal min.	max.	c3 min.	max.
<b>mm</b>							
10	18	10	25	18	33	25	45
18	24	12	28	20	36	28	48
24	30	12	28	23	43	30	61
30	40	13	33	28	46	40	64
40	50	14	36	30	51	45	73
50	65	18	43	38	61	55	90
65	80	20	51	46	71	65	105
80	100	24	58	53	84	75	120
100	120	28	66	61	97	90	140
120	140	33	81	71	114	150	160

Table 16

## Bearing Size selection

**The bearing size is usually selected according to the required life and reliability under a specific type of load charged on the spherical outside surface ball bearing**

The load applied to the bearing operating under static or slow oscillating and rotating ( $n < 10\text{r/min}$ ) condition is defined as dynamic load.

The load capacity of the bearing is expressed by the basic dynamic load rating which is shown in the spherical outside surface ball bearing's table.

Under normal mounting, lubricating and maintaining conditions, the operating bearing will have fatigue flaking due to the repeating action of variable load charged on the contact area between the rings and rolling elements. Generally, the fatigue flaking is the cause of normal damage of rolling bearings. Therefore, the usual bearing life refers to the bearing fatigue life. The life of group of apparently identical bearings operating under a considerable dispersion. For this reason, the bearing life is closely connected with the damaging probability or the reliability requirement.

The radial rating load of ball bearing with 90% reliability and 500 hours minimum life is shown in figure 7.

#### Life:

The life of a rolling bearing is defined as the total number of revolution which the bearing is capable of enduring before the first evidence of fatigue flaking develops on any one rings or rolling elements.

#### Reliability:

The reliability is the percentage of the bearings of a group of apparently identical bearings operating under identical conditions which can expect to attain or exceed a certain defined life. The reliability of individual bearings is the probability of the bearing to attain or exceed a defined life.

**Basic rating life:** For a group of apparently identical rolling bearings operating under identical conditions, the basic rating life is defined as the total number of revolutions that 90% of the bearings can be expected to complete or exceed.

#### Basic rating life

The fatigue rating life of spherical outside surface ball bearings is calculated by the following formula:

$$L_{10} = \left(\frac{C}{P}\right)^3, \text{ or } \frac{C}{P} = L_{10}^{1/3}$$

where:

$L_{10}$  - basic rating life,  $10^6$ r

$P$  - basic dynamic load rating, N

$N$  - equivalent dynamic bearing load, N

The basic dynamic load rating C is a hypothetical constant load with a fixed direction under which the bearing can attain a basic life of one million revolutions theoretically. For radial bearings, the load refers to the radial load.

The equivalent dynamic bearing load P is a constant load with a fixed direction under which the bearing life is identical to that of the bearing operating under actual load.

For a bearing operating with a constant rotation speed, the basic rating life can be expressed in terms of operating hours:

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3, \text{ or } L_{10h} = \frac{10^6}{60n} L_{10h} = \frac{16666}{n} \left(\frac{C}{P}\right)^3$$

where:

$L_{10h}$  - basic rating life, h

$n$  - bearing operating speed of rotation, r/min

For easier calculation, 500 hours as base of rating life is taken, and the speed factor  $f_n$  and the life factor  $f_h$  is introduced.

$$f_n = \left(\frac{331/3}{n}\right), f_h = \left(\frac{L_{10h}}{500}\right)$$

In this, the formula is simplified to:

$$C = \frac{f_h}{f_n} P,$$

The values of  $f_h$  and  $f_n$  can be found in figure 7 by referring to the operation speed n and the anticipated bearing service life  $L_{10h}$ . Then, with the radial load (or the equivalent dynamic bearing load), the basic dynamic load rating can be determined according to the spherical outside surface ball bearing's table. If the bearing operate under indeterminate loads and rotation speed, the following formula should be applied when calculating the bearing life:

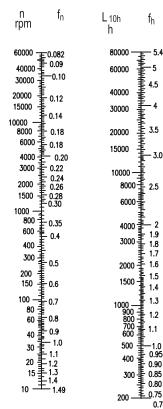
$$P_m = \sqrt[3]{\frac{1}{N} \int_0^N P^3 dN}$$

where:

$P_m$  - mean equivalent dynamic bearing load, N

$P$  - equivalent dynamic bearing load, N

$N$  - total revolution numbers with one load changing cycle, r



## Anticipated bearing service life

When selecting a bearing, one should usually predetermine an appropriate service life according to the relevant machine type, operating condition and reliability requirement. Generally the anticipated bearing service life can be determined by referring to the maintenance period of a machine.

Calculating method of equivalent dynamic bearing load  $P$ .

The basic equivalent dynamic bearing load is determined under a hypothetical condition. When calculating the bearing life, the actual load has to be converted to dynamic bearing load which is in conformity with the load condition determining the dynamic load rating. General equation for calculating the equivalent dynamic bearing load:

$$P = X F_r + Y F_a$$

where:

- $P$  - equivalent dynamic bearing load, N
- $F_r$  - actual radial load, N
- $F_a$  - actual axial load, N
- $X$  - radial factor
- $Y$  - thrust factor

The values of  $X$  and  $Y$  are determined by the ratio between the applied axial load  $F_a$  and the basic static load rating  $C_0$ . The axial load which the spherical outside surface ball bearing can carry is determined by the mounting method of the bearing on the shaft.

For bearing of set-screw Locking type or eccentric Locking collar type, if flexible shafts are applied and the set-screws are tightened enough, the axial load  $F_a$  which the bearings can carry not surpass 20% of the radial load  $F_r$ .

For bearing of adapter sleeve Locking type, if the nut is properly tightened, the axial load  $F_a$  can be maximally 15% to 20% of the radial load.

The value of radial and thrust factors  $X$  and  $Y$  for spherical outside surface ball bearings can be obtained from the following Table 17.

When twist load is applied to the bearing, the equivalent dynamic bearing load is calculated by the following equation:

$$P_m = f_m P$$

where:

- $P_m$  - equivalent dynamic bearing load when considering twist load
- $f_m$  - twist load factor, which is defined as follows:
  - when the twist load is small:  $f_m = 1,5$
  - when the twist load is big:  $f_m = 2$

## Example of bearing size selection

When shocking load is applied to the bearing, the equivalent dynamic bearing load can be calculated by the following equation:

$$P_d = f_d P$$

where:

- $P_d$  - equivalent dynamic bearing load when considering shocking load
- $f_d$  - shocking load factor, which is defined as follows:
  - when no shocking load or mirror shocking load is applied:  $f_d = 1-1,2$
  - when adequate shocking load is applied:  $f_d = 1,2 - 1,8$

How to select the size of bearing: one spherical outside surface ball bearings is to operate at a rotation speed of 1000r/min under only a radial load of  $F_r = 3000$  N, with a basic rating life of at least 20,000 hours.

Select the bearing size

From the required rotation speed it can be found that:  $f_n = 0,322$  (figure 7 shows about 0,32, refer to page 631).

From the required basic rating life (anticipated service life), it can be found that:

$f_h = 3,42$  (figure 7 shows about 3,4, refer to page 631).

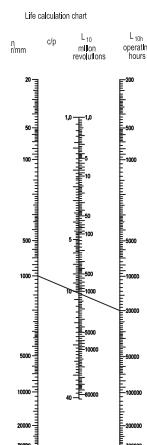
Under only radial load, i.e.

$$P = Fr = 3000 \text{ N}$$

Therefore,

$$C = \frac{\int h}{\int n} P = \frac{3,42}{0,322} = 31,863 \text{ N}$$

A simplified way to calculate the bearing life can be applied by using figure 8.



### Radial and thrust factors X and Y for spherical outside surface ball bearings

Table 17

Clearance for normal				Clearance for C3			
$\frac{F_a}{C_a}$	$\frac{F_a}{F_r} \leq e$	$\frac{F_a}{F_r} > e$	e	$\frac{F_a}{F_r} \leq e$	$\frac{F_a}{F_r} > e$	e	
X	Y	X	Y	X	Y	X	Y
0,025	1	0	0,56	2	0,22	1	0
0,04	1	0	0,56	1,8	0,24	1	0
0,07	1	0	0,56	1,6	0,27	1	0
0,13	1	0	0,56	1,4	0,31	1	0
0,25	1	0	0,56	1,2	0,37	1	0
0,5	1	0	0,56	1	0,44	1	0

By connecting n and the required basic rating life  $L_{10h}$  with a straight line, it can be found that C/P value is 10,6.

As is known,  $P = F_r = 3000$  N, thus the required basic dynamic load rating is:

$$C = 3000 \times 10,6 = 31,800, \text{ N}$$

In this way, we can select the spherical outside surface ball bearings inside this catalogue (refer to pages 699-705).

### Life adjustment factor for reability $a_1$

Table 18

Reability	90	95	96	97	98	99
%						
$L_n$	$L_{10}$	$L_5$	$L_4$	$L_3$	$L_2$	$L_1$
$a_1$	1	0,62	0,53	0,44	0,33	0,21

### Life adjustment factor for materials $a_2$

Table 19

Normal chromium bearing steel	$a_2 = 1$
Special smelted bearing steel	$a_2 = 3$
Vacuum degassed bearing steel	$a_2 = 5$
When material hardness lowered by high frequency	$a_2 < 1$
tempering	

### Life adjustment factor for operating conditions $a_3$

Table 20

When under normal operating conditions: - properly mounted - sufficiently lubricated - without outside matters intrustion	$a_3 = 1$
When under operating temperature, $a_3 < 1$ the spherical outside surface ball bearings lubricating grease viscosity lower than $13 \text{ mm}^2/\text{s}$	

### Adjusted rating life equation

The basic rating life  $L_{10}$  calculated with bearing life calculation formula can be applied to calculate the rating life of bearings made of ordinary bearing steel (i.e. bearing life with reliability of 90%)

Due to more and more of machinery products demanding higher reliability and better quality steel (ISO 281/1-1977), an adjusted rating life calculation equation is suggested. i.e.

$$L_n = a_1 a_2 a_3 L_{10}$$

For spherical outside surface ball bearing:

$$L_n = a_1 a_2 a_3 (C/P)^3$$

where:

$L_n$  - under specified material and lubricating conditions, bearing life with  $(100-n)\%$  no breaking probability (i.e. reability).  
 $a_1$  - life adjustment factor for reability (table 18)

$a_2$  - life adjustment factor materials (table 19)  
 $a_3$  - life adjustment factor for operating conditions (table 20)

## Selection of shaft

The shaft on which bearing units are mounted shall be free from band and flexure.

For the units with cylindrical bore (with set-screws or eccentric locking collar) clearance fit is usually adopted for mounting the units on the shaft, and shaft tolerances in table 21 are recommended for such loose fit, but for high speed or highly accurate operation or such

application which is accompanied by heavy shock loads, interference fit is to be adopted. Table 22 shows recommended shaft with interference fit, the eccentric locking collar may omitted.

Tapered bore bearings permit wider tolerances of the shaft since they are locked to the shaft by means of adapted sleeves.

Recommended shaft tolerances for tapered bore bearings listed in table 23.

Shaft tolerances for clearance fit for bearing with cylindrical bore									
Shaft diameter		Deviation of tolerances in shaft							
over	incl.	For lower speed		For medium speed		For rather high speed		For high speed	
		h9		h8		h7		J6	
mm		max.	min.	max.	min.	max.	min.	max.	min.
10	18	0	-43	0	-27	0	-18	+8	-3
18	30	0	-52	0	-33	0	-21	+9	-4
30	50	0	-62	0	-39	0	-25	+11	-5
50	80	0	-74	0	-46	0	-30	+12	-7
80	120	0	-87	0	-54	0	-35	+13	-9
120	180	0	-100	0	-63	0	-40	+14	-11

Shaft tolerances for interference fit for bearing with cylindrical bore									
Shaft diameter		Deviation of tolerances in shaft							
over	incl.	Higher speed		Rather heavy load		Highest load		Heavy load	
		m6		m7		m6		m7	
mm		max.	min.	max.	min.	max.	min.	max.	min.
10	18	+18	+7	+25	+7	+23	+12	+30	+12
18	30	+21	+8	+29	+8	+28	+15	+36	+15
30	50	+25	+9	+34	+9	+33	+17	+42	+17
50	80	+30	+11	+41	+11	+39	+20	+50	+20
80	120	+35	+13	+48	+13	+45	+23	+58	+23
120	180	+40	+15	+55	+15	+52	+27	+67	+27

Shaft tolerances for bearing with tapered bore					
Shaft diameter		Deviation of tolerances For shot shaft		Deviation of tolerances For shot shaft	
over	incl.	h9		h10	
mm		max.	min.	max.	min.
10	18	0	-43	0	-70
18	30	0	-52	0	-84
30	50	0	-62	0	-100
50	80	0	-74	0	-120
80	120	0	-87	0	-140
120	180	0	-100	0	-160

## Mounting of bearing units on shaft

The bearing units can be easily installed in principle at any place. However, in order to have a long service life, it is desirable that the mounting base is flat and rigid.

In case of either the vibration is caused to the bearing, the alternating movement takes place, the load applied to the bearing is large, or the

shaft rotation speed is rapid, it is desired to provide with the filed seat or concave section at the part where the set-screws contact with the shaft. If large thrust load is charged, it is recommended that joggling tightened with nuts be used to install the bearing most effectively to the shaft: as shown in figure 9.

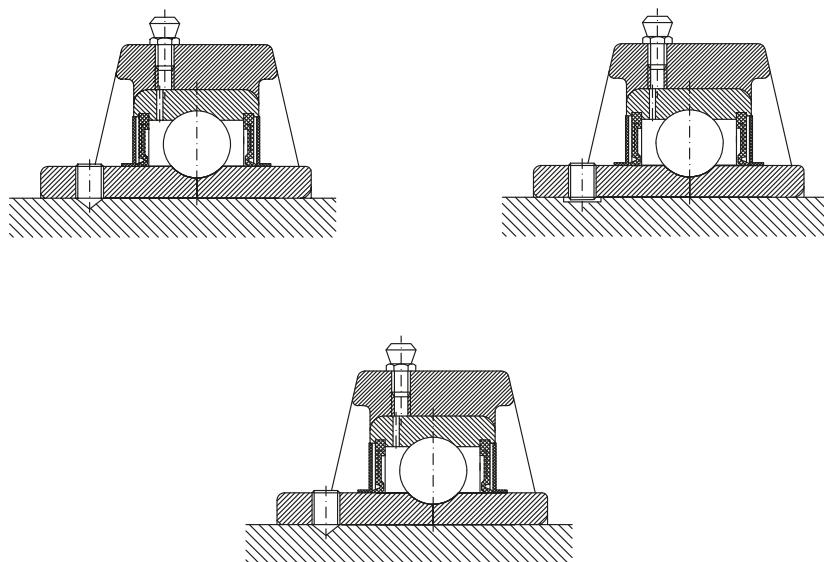


Fig. 9

### Bearings units with adapter sleeve

Bearing unit with adapter sleeve permits wider shaft tolerance and can be used in applications where vibrations and shocks are heavily.

Mounting processes of these units as follows:

First, the sleeve is installed to an arbitrary position. After the shark proof washer is inserted, the nut is tightened.

The proper nut tightening condition can be obtained if it is tightened enough by hand and then rotated by 2/5 to 3/5 revolution with a spanner.

After tightening the nut, bend the shark proof washer within the slot. Otherwise, the nut may be loosened and creep may be caused between the shaft and sleeve. It is necessary the nut can not be tightened too much.

### Bearings units with eccentric locking collar

The eccentric part of the collar mates with the inner ring of the bearing which is made eccentric with the collar. When locked to the shaft by hand in direction of the shaft rotation, the eccentric locking collar tightens automatically to the shaft by force of working radial load. Then, lock the set-screws provided on the collar to fix the eccentric collar to the shaft. At the shaft rotation force or load is not charged on the set-screws directly, it will not loosen during operation.

## Bearing units with set-screws

There are two set-screws located at two places on one side of the wide inner ring 120 apart with which the bearing units can be mounted to the shaft. When mounting the bearing to the shaft, the torque shown in the following table 23 is recommended to tighten the set screws to shaft.

## The material for cast iron housing

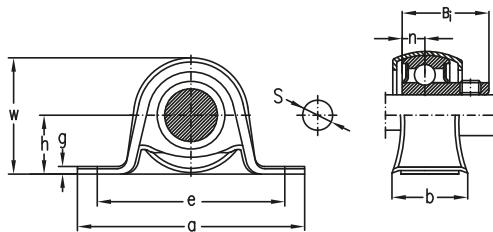
The material of cast iron housing under ISO/DIS GG20, the mechanical properties please refer to table 24.

Proper tightening torque of set-screws				
Set-screws type	Bearing type	Tightening torque	Table 24	
mm	inch		N.m	lbf.in
M 5x0,8	No. 10-32 UNF	SB 201 - SB 203, UC 201 - UC 203	3 - 3,5	28
M 6x1	1/4-28 UNF	SB 204 - SB 207, UC 204 - UC 206 SA 201 - SA 206, UEL 201 - UEL 205 UC X05, UC 305 - UC 306	3,5 - 4	30 - 35,4
M 8x1	5/16-24 UNF	SB 208, UC 207 - UC 209 SA 207 - SA 210, UEL 206 - UEL 210 UC X06 - UC X08, UC 307	8,0 - 8,5	69 - 73,5
M 10X1,25	3/8-24 UNF	UC 210 - UC 212 SA 211, UEL 211 - UEL 215 UC X09 - UC X11, UC 308 - 309	16,5 - 17,5	144 - 152
M 12X1,25	7/16-20 UNF	UC 213 - UC 218 UC X12 - UC X16 UC 310 - UC 314	26,5 - 27,5	235 - 243
M 14X1,5	1/2-20 UNF	UC 315 - UC 316	33,5 - 34,5	296 - 304

The mechanical properties of cast iron housing			
Number	Major wall thickness of casting piece	Strain stress	Hardness
	mm	N/mm <sup>2</sup>	HB
ISO/DIS GG20	2,5-10	220	
U.S.A. Grade 35	>10-20	195	170 - 220
JIS FC20	>20-30	170	
	30-50	160	

Pillow block type	page 638	
Flanged units type	page 654	
Two bolts flanged units type	page 665	
Flanged cartridge units type	page 680	
Hanger units type	page 687	
Cylindrical cartridge units type	page 689	
Take up units type	page 692	
Insert bearings	page 699	

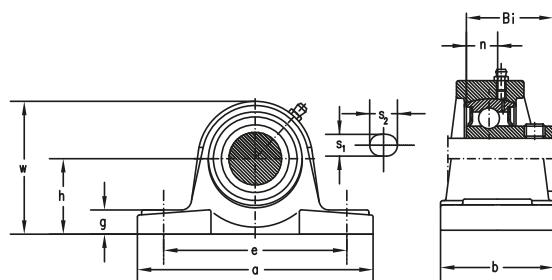
## Standard duty pillow blocks pressed steel housing set screws type



Shaft dia.	Nominal dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass	
	h	a	e	b	s	g	w	Bi						
mm														
12	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP201	SB201	PP203	0,17
15	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP202	SB202	PP203	0,16
17	22,2	86	68	25	9,5	3,2	43,8	22	6	M8	SBPP203	SB203	PP203	0,15
20	25,4	98	76	32	9,5	3,2	50,5	25	7	M8	SBPP204	SB204	PP204	0,22
25	28,6	108	86	32	11,5	4	56,6	27	7,5	M10	SBPP205	SB205	PP205	0,31
30	33,3	117	95	38	11,5	4	66,3	29	8	M10	SBPP206	SB206	PP206	0,45
35	39,7	129	106	42	11,5	4,6	78	32	8,5	M10	SBPP207	SB207	PP207	0,61

Note: Inch sizes available on request.

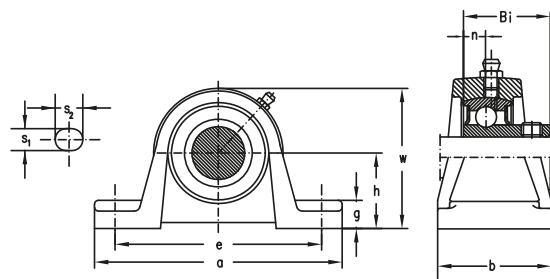
## Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia. dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
											-	-	-	-	Kg
20	31,8	128	98	38	11	14	14	63	25	7	M10	SBAK204	SB204	AK204	0,70
25	33,3	140	105	40	11	14	15	66,5	27	7,5	M10	SBAK205	SB205	AK205	0,81
30	39,7	160	121	44	14	19	17	79	29	8	M12	SBAK206	SB206	AK206	1,18
35	46	167	127	48	14	19	18	91	32	8,5	M12	SBAK207	SB207	AK207	1,61
40	49,2	181	140	52	14	19	19	98	34	9,5	M12	SBAK208	SB208	AK208	1,99

Note: Inch sizes available on request.

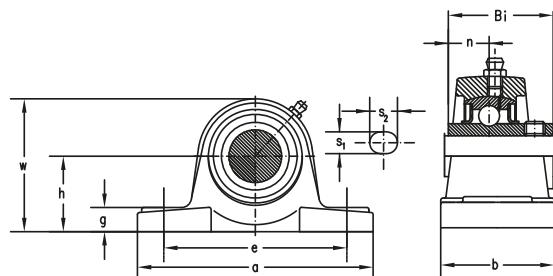
## Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia. dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass number	
										-				Kg	
20	33,3	127	96	35	13	16	14	65	25	7,0	M10	<b>SBP204</b>	<b>SB204</b>	<b>P204</b>	0,62
25	36,5	140	105	36	13	19	15	71	27	7,5	M10	<b>SBP205</b>	<b>SB205</b>	<b>P205</b>	0,73
30	42,9	160	121	42	14	19	16	84	29	8	M12	<b>SBP206</b>	<b>SB206</b>	<b>P206</b>	1,16
35	47,6	167	127	45	15	19	17	94	32	8,5	M12	<b>SBP207</b>	<b>SB207</b>	<b>P207</b>	1,46
40	49,2	180	137	49	15	21	18	100	34	9,5	M12	<b>SBP208</b>	<b>SB208</b>	<b>P208</b>	1,74

Note: Inch sizes available on request.

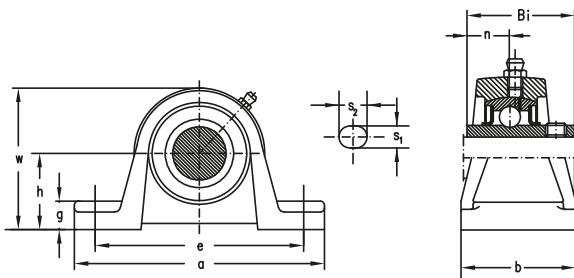
## Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia. dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
											-	-	-	-	Kg
20	31,8	128	98	38	11	14	14	63	31	12,7	M10	UCAK204	UC204	AK204	0,74
25	33,3	140	105	40	11	14	15	66,5	34	14,3	M10	UCAK205	UC205	AK205	0,85
30	39,7	160	121	44	14	19	17	79	38,1	15,9	M12	UCAK206	UC206	AK206	1,24
35	46,0	167	127	48	14	19	18	91	42,9	17,5	M12	UCAK207	UC207	AK207	1,70
40	49,2	181	140	52	14	19	19	98	49,2	19	M12	UCAK208	UC208	AK208	2,13
45	52,4	189	146	54	14	19	20	105	49,2	19	M12	UCAK209	UC209	AK209	2,39
50	55,6	203	159	57	17,5	21	21	111,5	51,6	19	M16	UCAK210	UC210	AK210	2,83
55	61,9	232	181	60	18	24	23	123	55,6	22,2	M16	UCAK211	UC211	AK211	3,85
60	68,3	241	191	64	18	24	25	136	65,1	25,4	M16	UCAK212	UC212	AK212	4,92
65	74,6	262	203	70	21	28	27	147,5	65,1	25,4	M20	UCAK213	UC213	AK213	6,13
70	77,8	266	210	74	21	28	28	153,5	74,6	30,2	M20	UCAK214	UC214	AK214	6,90
75	82,6	304	241	78	22	32	30	162	77,8	33,3	M20	UCAK215	UC215	AK215	8,56

Note: Inch sizes available on request.

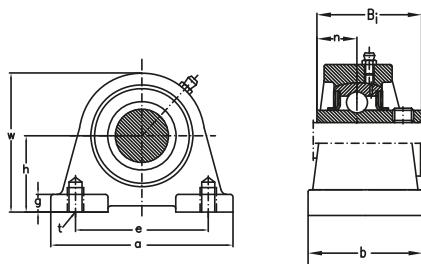
## Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass number
												-	-	-	Kg	
12	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP201	UC201	P203	0,68	
15	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP202	UC202	P203	0,67	
17	30,2	127	96	38	13	16	11	60,7	31	12,7	M10	UCP203	UC203	P203	0,66	
20	33,3	127	96	35	13	16	14	65,0	31	12,7	M10	UCP204	UC204	P204	0,66	
25	36,5	140	105	36	13	19	15	71,0	34	14,3	M10	UCP205	UC205	P205	0,77	
30	42,9	160	121	42	14	19	16	84,0	38,1	15,9	M12	UCP206	UC206	P206	1,22	
35	47,6	167	127	45	15	19	17	94,0	42,9	17,5	M12	UCP207	UC207	P207	1,55	
40	49,2	180	137	49	15	21	18	100,0	49,2	19	M12	UCP208	UC208	P208	1,88	
45	54	189	146	50	15	21	20	107,5	49,2	19	M12	UCP209	UC209	P209	2,19	
50	57,2	204	159	56	19	22	21	114,0	51,6	19	M16	UCP210	UC210	P210	2,73	
55	63,5	217	172	58	19	22	22	126	55,6	22,2	M16	UCP211	UC211	P211	3,38	
60	69,9	238	186	64	19	25	24	139	65,1	25,4	M16	UCP212	UC212	P212	4,75	
65	76,2	262	203	70	23	29	26	149	65,1	25,4	M20	UCP213	UC213	P213	5,81	
70	79,4	266	210	72	23	29	27	155	74,6	30,2	M20	UCP214	UC214	P214	6,50	
75	82,6	274	217	74	25	29	28	161,6	77,8	33,3	M20	UCP215	UC215	P215	7,11	
80	88,9	292	232	78	25	30	30	174	82,6	33,3	M20	UCP216	UC216	P216	8,69	
85	95,2	310	247	83	25	30	32	186	85,7	34,1	M20	UCP217	UC217	P217	10,63	
90	101,6	326	262	88	27	30	33	198	96	39,7	M22	UCP218	UC218	P218	12,95	

Note: Inch sizes available on request.

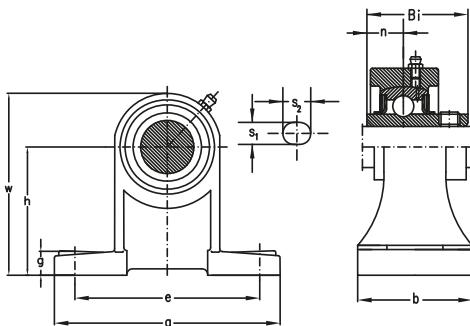
## Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass
	h	a	e	b	g	w	f	t	Bi	n	-	-	-	-	Kg
12	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA201	UC201	PA204	0,57
15	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA202	UC202	PA204	0,56
17	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA203	UC203	PA204	0,55
20	30,2	76	52	40	11	62	13	M10	31	12,7	M10	UCPA204	UC204	PA204	0,53
25	36,5	84	56	38	12	72	15	M10	34	14,3	M10	UCPA205	UC205	PA205	0,71
30	42,9	94	66	48	13	84	18	M14	38,1	15,9	M14	UCPA206	UC206	PA206	1,07
35	47,6	110	80	48	13	95	20	M14	42,9	17,5	M14	UCPA207	UC207	PA207	1,49
40	49,2	116	84	54	13	100	20	M14	49,2	19	M14	UCPA208	UC208	PA208	1,75
45	54,2	120	90	60	13	108	25	M14	49,2	19	M14	UCPA209	UC209	PA209	2,17
50	57,2	130	94	60	14	116	25	M16	51,6	19	M16	UCPA210	UC210	PA210	2,53
55	63,5	140	104	66	14	125	25	M16	55,6	22,2	M16	UCPA211	UC211	PA211	3,17
60	69,9	150	114	68	15	138	25	M16	65,1	25,4	M16	UCPA212	UC212	PA212	4,17
65	76,2	160	124	70	15	150	25	M16	65,1	25,4	M16	UCPA213	UC213	PA213	4,96

Note: Inch sizes available on request.

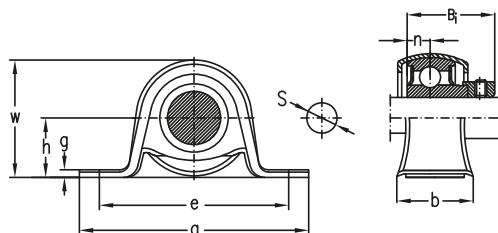
## Standard duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
												-	-	-	-	Kg
12	70	127	95	40	12	16	13	101	30	12,7	M10	UCPH201	UC201	PH204	0,81	
15	70	127	95	40	12	16	13	101	30	12,7	M10	UCPH202	UC202	PH204	0,80	
17	70	127	95	40	12	16	13	101	31	12,7	M10	UCPH203	UC203	PH204	0,79	
20	70	127	95	40	12	16	13	101	31	12,7	M10	UCPH204	UC204	PH204	0,77	
25	80	140	105	50	13	19	16	114	34	14,3	M10	UCPH205	UC205	PH205	1,01	
30	90	165	121	50	17	21	18	130	38,1	15,9	M14	UCPH206	UC206	PH206	1,56	
35	95	167	127	60	17	21	19	140	42,9	17,5	M14	UCPH207	UC207	PH207	1,88	
40	100	184	137	66	17	21	20	150	49,2	19,0	M14	UCPH208	UC208	PH208	2,44	
45	105	190	146	70	17	21	20	158	49,2	19,0	M14	UCPH209	UC209	PH209	2,72	
50	110	204	159	70	19	22	22	165	51,6	19,0	M16	UCPH210	UC210	PH210	3,08	
55	120	217	171	75	19	22	23	181	55,6	22,2	M16	UCPH211	UC211	PH211	4,05	
60	130	236	186	80	19	22	24	197	65,1	25,4	M16	UCPH212	UC212	PH212	4,78	
65	140	258	203	85	23	28	26	213	65,1	25,4	M20	UCPH213	UC213	PH213	5,93	
70	150	266	210	90	23	28	27	227	74,6	30,2	M20	UCPH214	UC214	PH214	6,99	
75	160	274	217	95	23	28	28	240	77,8	33,3	M20	UCPH215	UC215	PH215	7,84	
80	170	290	232	100	24	28	30	256	82,6	33,3	M20	UCPH216	UC216	PH216	9,13	

Note: Inch sizes available on request.

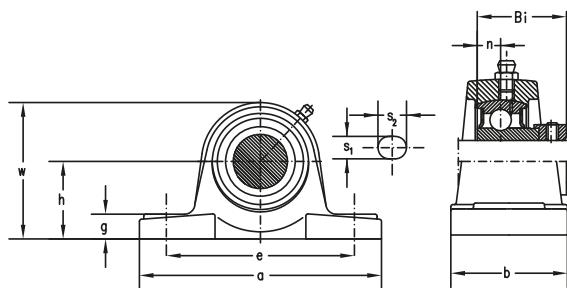
## Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass	
	h	a	e	b	s	g	w	B1						
mm														
12	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP201	SA201	PP203	0,21
15	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP202	SA202	PP203	0,20
17	22,2	86	68	25	9,5	3,2	43,8	28,5	6	M8	SAPP203	SA203	PP203	0,19
20	25,4	98	76	32	9,5	3,2	50,5	29,7	7	M8	SAPP204	SA204	PP204	0,27
25	28,6	108	86	32	11,5	4	56,6	30,5	7,5	M10	SAPP205	SA205	PP205	0,34
30	33,3	117	95	38	11,5	4	66,3	33,9	8	M10	SAPP206	SA206	PP206	0,52
35	39,7	129	106	42	11,5	4,6	78	37,5	8,5	M10	SAPP207	SA207	PP207	0,73

Note: Inch sizes available on request.

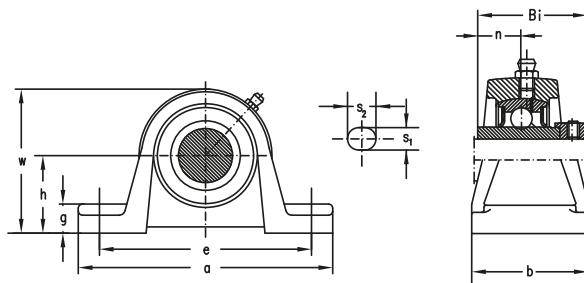
## Standard duty pillow blocks pressed steel housing eccentric locking collar type



Shaft Nominal dia. dimensions											Bolt	Unit	Bearing Housing Mass	
	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	size	number	number	
mm														
<b>20</b>	31,8	128	98	38	11	14	14	63,0	29,5	7,0	M10	<b>SAAK204</b>	<b>SA204</b>	<b>AK204</b> 0,75
<b>25</b>	33,3	140	105	40	11	14	15	66,5	30,5	7,5	M10	<b>SAAK205</b>	<b>SA205</b>	<b>AK205</b> 0,84
<b>30</b>	39,7	160	121	44	14	19	17	79	33,9	8	M12	<b>SAAK206</b>	<b>SA206</b>	<b>AK206</b> 1,25
<b>35</b>	46	167	127	48	14	19	18	91	37,5	8,5	M12	<b>SAAK207</b>	<b>SA207</b>	<b>AK207</b> 1,73
<b>40</b>	49,2	181	140	52	14	19	19	98	40,5	9,5	M12	<b>SAAK208</b>	<b>SA208</b>	<b>AK208</b> 2,14
<b>45</b>	52,4	189	146	54	14	19	20	105	42,2	10	M12	<b>SAAK209</b>	<b>SA209</b>	<b>AK209</b> 2,40
<b>50</b>	55,6	203	159	57	17,5	21	21	111,5	43,7	10,5	M16	<b>SAAK210</b>	<b>SA210</b>	<b>AK210</b> 2,83
<b>55</b>	61,9	232	181	60	18	24	23	123	48,4	11,5	M16	<b>SAAK211</b>	<b>SA211</b>	<b>AK211</b> 3,60

Note: Inch sizes available on request.

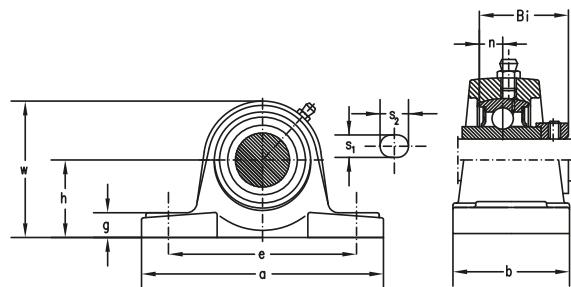
## Standard duty pillow blocks cast housing eccentric locking collar type



Shaft Nominal dia. dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
															Kg
mm															
<b>20</b>	33,3	127	96	35	13	16	14	65	29,5	7	M10	<b>SAP204</b>	<b>SA204</b>	<b>P204</b>	0,67
<b>25</b>	36,5	140	105	36	13	19	15	71	30,5	7,5	M10	<b>SAP205</b>	<b>SA205</b>	<b>P205</b>	0,76
<b>30</b>	42,9	160	121	42	14	19	16	84	33,9	8	M12	<b>SAP206</b>	<b>SA206</b>	<b>P206</b>	1,23
<b>35</b>	47,6	167	127	45	15	19	17	94	37,5	8,5	M12	<b>SAP207</b>	<b>SA207</b>	<b>P207</b>	1,58
<b>40</b>	49,2	180	137	49	15	21	18	100	40,5	9,5	M12	<b>SAP208</b>	<b>SA208</b>	<b>P208</b>	1,89
<b>45</b>	54	189	146	50	15	21	20	107,5	42,2	10	M12	<b>SAP209</b>	<b>SA209</b>	<b>P209</b>	2,20
<b>50</b>	57,2	204	159	56	19	22	21	114	43,7	10,5	M16	<b>SAP210</b>	<b>SA210</b>	<b>P210</b>	2,73
<b>55</b>	63,5	217	172	58	19	22	22	126	48,4	11,5	M16	<b>SAP211</b>	<b>SA211</b>	<b>P211</b>	3,13

Note: Inch sizes available on request.

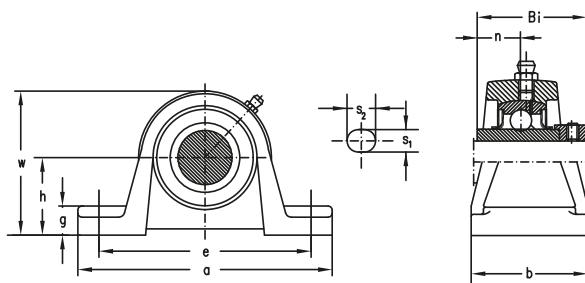
## Standard duty pillow blocks cast housing eccentric locking collar type



Shaft Nominal dia.	dimensions	Bolt size	Unit number	Bearing Housing number	Mass number
mm					Kg
<b>20</b>	31,8 128 98 38 11 14 14 63,0 43,5 17 M10	<b>UELAK204</b>	<b>UEL204</b>	<b>AK204</b>	0,79
<b>25</b>	33,3 140 105 40 11 14 15 66,5 44,3 17,4 M10	<b>UELAK205</b>	<b>UEL205</b>	<b>AK205</b>	0,89
<b>30</b>	39,7 160 121 44 14 19 17 79,0 48,3 18,2 M12	<b>UELAK206</b>	<b>UEL206</b>	<b>AK206</b>	1,33
<b>35</b>	46,0 167 127 48 14 19 18 91,0 51,1 18,8 M12	<b>UELAK207</b>	<b>UEL207</b>	<b>AK207</b>	1,83
<b>40</b>	49,2 181 140 52 14 19 19 98,0 56,3 21,4 M12	<b>UELAK208</b>	<b>UEL208</b>	<b>AK208</b>	2,27
<b>45</b>	52,4 189 146 54 14 19 20 105,0 56,3 21,4 M12	<b>UELAK209</b>	<b>UEL209</b>	<b>AK209</b>	2,56
<b>50</b>	55,6 203 159 57 17,5 21 21 111,5 62,7 24,6 M16	<b>UELAK210</b>	<b>UEL210</b>	<b>AK210</b>	3,04
<b>55</b>	61,9 232 181 60 18 24 23 123 71,3 27,7 M16	<b>UELAK211</b>	<b>UEL211</b>	<b>AK211</b>	4,12
<b>60</b>	68,3 241 191 64 18 24 25 136 77,7 30,9 M16	<b>UELAK212</b>	<b>UEL212</b>	<b>AK212</b>	5,26
<b>65</b>	74,6 262 203 70 21 28 27 147,5 85,7 34,1 M20	<b>UELAK213</b>	<b>UEL213</b>	<b>AK213</b>	6,68
<b>70</b>	77,8 266 210 74 21 28 28 153,5 85,7 34,1 M20	<b>UELAK214</b>	<b>UEL214</b>	<b>AK214</b>	7,42
<b>75</b>	82,6 304 241 78 21 32 30 162 92,1 37,3 M20	<b>UELAK215</b>	<b>UEL215</b>	<b>AK215</b>	9,19

Note: Inch sizes available on request.

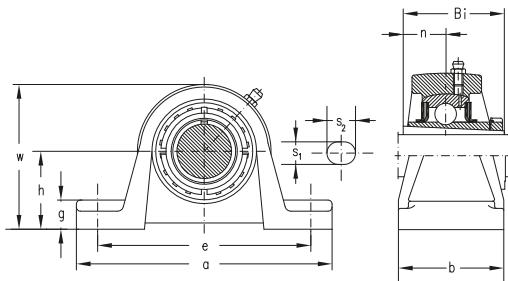
## Standard duty pillow blocks cast housing eccentric locking collar type



Shaft Nominal dia. dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing Housing number	Mass number
											-	-	-	Kg
12	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL201	UEL201 P203	0,74
15	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL202	UEL202 P203	0,72
17	30,2	127	96	38	13	16	11	60,7	43,5	17,0	M10	UEL203	UEL203 P203	0,71
20	33,3	127	96	35	13	16	14	65,0	43,5	17,0	M10	UEL204	UEL204 P204	0,71
25	36,5	140	105	36	13	19	15	71,0	44,3	17,4	M10	UEL205	UEL205 P205	0,81
30	42,9	160	121	42	14	19	16	84,0	48,3	18,2	M12	UEL206	UEL206 P206	1,31
35	47,6	167	127	45	15	19	17	94,0	51,1	18,8	M12	UEL207	UEL207 P207	1,68
40	49,2	180	137	49	15	21	18	100,0	56,3	21,4	M12	UEL208	UEL208 P208	2,02
45	54	189	146	50	15	21	20	107,5	56,3	21,4	M12	UEL209	UEL209 P209	2,36
50	57,2	204	159	56	19	22	21	114,0	62,7	24,6	M16	UEL210	UEL210 P210	2,94
55	63,5	217	172	58	19	22	22	126	71,3	27,7	M16	UEL211	UEL211 P211	3,59
60	69,9	238	186	64	19	25	24	139	77,7	30,9	M16	UEL212	UEL212 P212	4,95
65	76,2	262	203	70	23	25	26	149	85,7	34,1	M20	UEL213	UEL213 P213	6,35
70	79,4	266	210	72	23	29	27	155	85,7	34,1	M20	UEL214	UEL214 P214	6,95
75	82,6	274	217	74	25	29	28	161,6	92,1	37,3	M20	UEL215	UEL215 P215	7,70

Note: Inch sizes available on request.

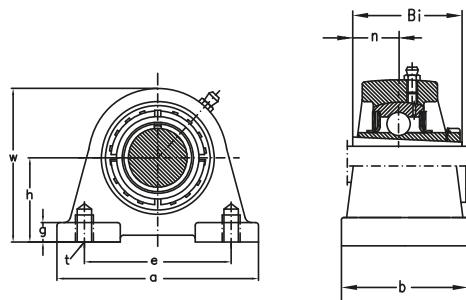
## Standard duty pillow blocks cast housing adapter type



Shaft Nominal dia. dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass
										-	-	-	-	-
mm														
<b>20</b>	36,5	140	105	36	13	19	15	71	35	M10	<b>UKP205</b>	<b>UK205</b>	<b>P205</b>	0,71
<b>25</b>	42,9	160	121	42	14	19	16	84	38	M12	<b>UKP206</b>	<b>UK206</b>	<b>P206</b>	1,15
<b>30</b>	47,6	167	127	45	15	19	17	94	43	M12	<b>UKP207</b>	<b>UK207</b>	<b>P207</b>	1,45
<b>35</b>	49,2	180	137	49	15	21	18	100	46	M12	<b>UKP208</b>	<b>UK208</b>	<b>P208</b>	1,72
<b>40</b>	54	189	146	50	15	21	20	107,5	50	M12	<b>UKP209</b>	<b>UK209</b>	<b>P209</b>	2,04
<b>45</b>	57,2	204	159	56	19	22	21	114	55	M16	<b>UKP210</b>	<b>UK210</b>	<b>P210</b>	2,52
<b>50</b>	63,5	217	172	58	19	22	22	126	59	M16	<b>UKP211</b>	<b>UK211</b>	<b>P211</b>	3,03
<b>55</b>	69,9	238	186	64	19	25	24	139	62	M16	<b>UKP212</b>	<b>UK212</b>	<b>P212</b>	4,25
<b>60</b>	76,2	262	203	70	23	29	26	149	65	M20	<b>UKP213</b>	<b>UK213</b>	<b>P213</b>	5,31

Note: Inch sizes available on request.

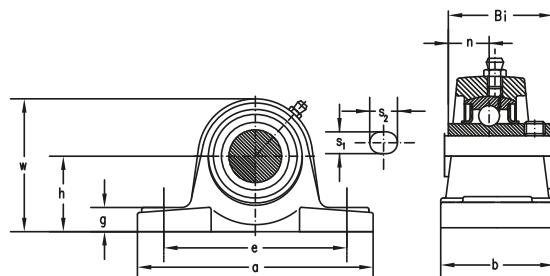
## Standard duty pillow blocks cast housing adapter type



Shaft Nominal dia. dimensions	h	a	e	b	g	w	f	t	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass
											-	-	-	Kg
20	36,5	84	56	38	12	72	15	M10	35	M10	UKPA205	UK205	PA205	0,65
25	42,9	94	66	48	13	84	18	M14	38	M14	UKPA206	UK206	PA206	1,00
30	47,6	110	80	48	13	95	20	M14	43	M14	UKPA207	UK207	PA207	1,39
35	49,2	116	84	54	13	100	20	M14	46	M14	UKPA208	UK208	PA208	1,59
40	54,2	120	90	60	13	108	25	M14	50	M14	UKPA209	UK209	PA209	2,02
45	57,2	130	94	60	14	116	25	M16	55	M16	UKPA210	UK210	PA210	2,32
50	63,5	140	104	66	14	125	25	M16	59	M16	UKPA211	UK211	PA211	2,82
55	69,9	150	114	68	15	138	25	M16	62	M16	UKPA212	UK212	PA212	3,67
60	76,2	160	124	70	15	150	25	M16	65	M16	UKPA213	UK213	PA213	4,46

Note: Inch sizes available on request.

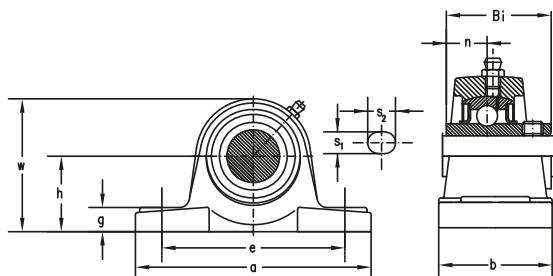
## Medium duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing Housing Mass		
	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n			number	number	
mm														Kg	
<b>25</b>	44,4	159	119	51	17	20	17	85	38,1	15,9	M14	<b>UCPX05</b>	<b>UCX05</b>	<b>PX05</b>	1,48
<b>30</b>	47,6	175	127	54	17	20	20	93	42,9	17,5	M14	<b>UCPX06</b>	<b>UCX06</b>	<b>PX06</b>	1,85
<b>35</b>	54	203	144	57	17	20	21	105	49,2	19	M14	<b>UCPX07</b>	<b>UCX07</b>	<b>PX07</b>	2,49
<b>40</b>	58,7	222	156	65	20	23	23	112	49,2	19	M16	<b>UCPX08</b>	<b>UCX08</b>	<b>PX08</b>	3,13
<b>45</b>	58,7	222	156	67	20	23	25	116	51,6	19	M16	<b>UCPX09</b>	<b>UCX09</b>	<b>PX09</b>	3,35
<b>50</b>	63,5	240	171	71	20	23	25	126	55,6	22,2	M16	<b>UCPX10</b>	<b>UCX10</b>	<b>PX10</b>	4,17
<b>55</b>	69,8	260	184	79	25	28	29	137	65,1	25,4	M20	<b>UCPX11</b>	<b>UCX11</b>	<b>PX11</b>	5,65
<b>60</b>	76,2	280	203	81	25	28	31	149	65,1	25,4	M20	<b>UCPX12</b>	<b>UCX12</b>	<b>PX12</b>	6,80
<b>65</b>	76,2	286	203	83	25	28	33	152	74,6	30,2	M20	<b>UCPX13</b>	<b>UCX13</b>	<b>PX13</b>	7,42
<b>70</b>	88,9	320	229	85	27	30	34	170	77,8	33,3	M22	<b>UCPX14</b>	<b>UCX14</b>	<b>PX14</b>	9,59
<b>75</b>	88,9	330	229	92	27	30	35	175	82,6	33,3	M22	<b>UCPX15</b>	<b>UCX15</b>	<b>PX15</b>	10,91
<b>80</b>	101,6	378	283	99	27	30	37	194	85,7	34,1	M22	<b>UCPX16</b>	<b>UCX16</b>	<b>PX16</b>	15,09

Note: Inch sizes available on request.

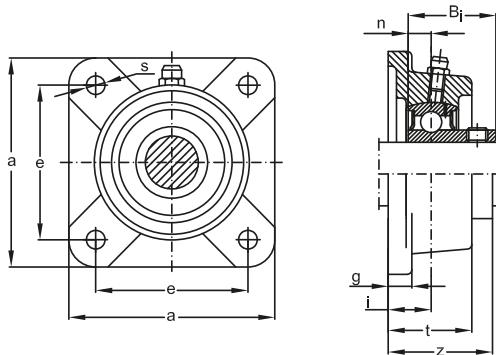
## Heavy duty pillow blocks cast housing set screws type



Shaft Nominal dia.	dimensions	h	a	e	b	s <sub>1</sub>	s <sub>2</sub>	g	w	Bi	n	Bolt size	Unit number	Bearing Housing number	Mass number
												-	-	Kg	
<b>25</b>	45	173	132	45	17	20	15	85	38	15	M14	<b>UCP305</b>	<b>UC305</b>	<b>P305</b>	1,27
<b>30</b>	50	180	140	50	17	20	15	95	43	17	M14	<b>UCP306</b>	<b>UC306</b>	<b>P306</b>	1,86
<b>35</b>	56	210	160	56	17	25	19	106	48	19	M14	<b>UCP307</b>	<b>UC307</b>	<b>P307</b>	2,66
<b>40</b>	60	218	170	62	18	25	19	116	52	19	M14	<b>UCP308</b>	<b>UC308</b>	<b>P308</b>	3,37
<b>45</b>	67	244	190	66	20	26	23	129	57	22	M16	<b>UCP309</b>	<b>UC309</b>	<b>P309</b>	4,26
<b>50</b>	75	271	212	74	20	30	26	143	61	22	M16	<b>UCP310</b>	<b>UC310</b>	<b>P310</b>	6,17
<b>55</b>	80	300	236	80	20	32	29	154	66	25	M16	<b>UCP311</b>	<b>UC311</b>	<b>P311</b>	7,12
<b>60</b>	85	325	250	85	23	35	31	164	71	26	M20	<b>UCP312</b>	<b>UC312</b>	<b>P312</b>	9,10
<b>65</b>	90	335	260	90	25	38	33	176	75	30	M20	<b>UCP313</b>	<b>UC313</b>	<b>P313</b>	11,04
<b>70</b>	95	360	280	93	27	40	34	187	78	33	M22	<b>UCP314</b>	<b>UC314</b>	<b>P314</b>	12,82
<b>75</b>	100	380	290	100	27	40	35	198	82	32	M22	<b>UCP315</b>	<b>UC315</b>	<b>P315</b>	15,40
<b>80</b>	106	400	300	105	27	40	37	210	86	34	M22	<b>UCP316</b>	<b>UC316</b>	<b>P316</b>	18,00

Note: Inch sizes available on request.

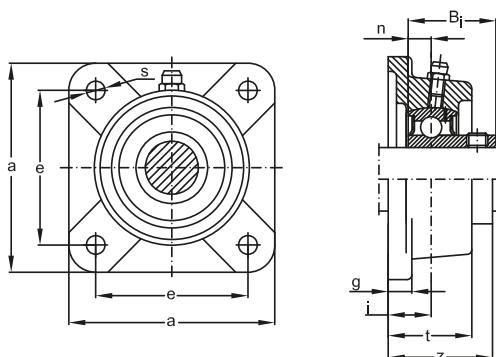
**Standard duty flanged units cast housing  
set screws type**



Shaft Nominal dia.	dimensions	a	e	i	g	t	s	z	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass
										n	-	Kg		
20	86	63,5	19	15	29,5	11,5	37,0	25	7,0	M10	<b>SBFS204</b>	<b>SB204</b>	<b>FS204</b>	0,59
25	93	70,0	19	15	30,0	11,5	38,5	27	7,5	M10	<b>SBFS205</b>	<b>SB205</b>	<b>FS205</b>	0,72
30	106	82,5	20	16	32,5	13,0	41,0	29	8,0	M12	<b>SBFS206</b>	<b>SB206</b>	<b>FS206</b>	0,95
35	116	92,0	21	17	35,0	13,0	44,5	32	8,5	M12	<b>SBFS207</b>	<b>SB207</b>	<b>FS207</b>	1,25
40	129	101,5	24	17	39,0	14,0	48,5	34	9,5	M12	<b>SBFS208</b>	<b>SB208</b>	<b>FS208</b>	1,60

Note: Inch sizes available on request.

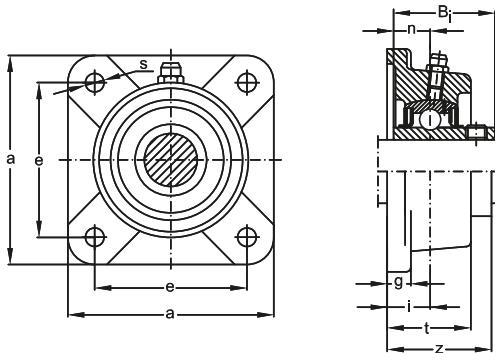
**Standard duty flanged units cast housing  
set screws type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	z							
mm														
20	86	64	15	12	25,5	12	33,0	25	7,0	M10	SBF204	SB204	F204	0,49
25	95	70	16	13	27,0	12	35,5	27	7,5	M10	SBF205	SB205	F205	0,70
30	108	83	18	13	31,0	12	39,0	29	8,0	M10	SBF206	SB206	F206	0,99
35	117	92	19	15	34,0	14	42,5	32	8,5	M12	SBF207	SB207	F207	1,25
40	130	102	21	15	36,0	16	45,5	34,0	9,5	M14	SBF208	SB208	F208	1,63

Note: Inch sizes available on request.

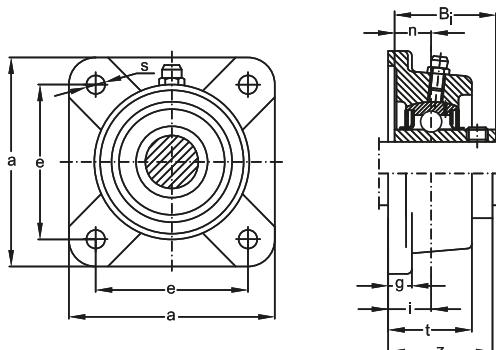
**Standard duty flanged units cast housing  
set screws type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	z							
mm														
20	86	63,5	19	15	29,5	11,5	37,3	31,0	12,7	M10	UCFS204	UC204	FS204	0,63
25	93	70,0	19	15	30,0	11,5	38,7	34,0	14,3	M10	UCFS205	UC205	FS205	0,76
30	106	82,5	20	16	32,5	13,0	42,2	38,1	15,9	M12	UCFS206	UC206	FS206	1,01
35	116	92,0	21	17	35,0	13,0	46,4	42,9	17,5	M12	UCFS207	UC207	FS207	1,34
40	129	101,5	24	17	39,0	14,0	54,2	49,2	19,0	M12	UCFS208	UC208	FS208	1,74
45	135	105,0	24	18	40,0	16,0	54,2	49,2	19,0	M14	UCFS209	UC209	FS209	1,98
50	143	111,0	28	20	45,0	16,0	60,6	51,6	19,0	M14	UCFS210	UC210	FS210	2,43
55	162	130,0	31	21	49,0	17,0	64,4	55,6	22,2	M14	UCFS211	UC211	FS211	3,43
60	175	143,0	34	22	53,5	17,0	73,7	65,1	25,4	M14	UCFS212	UC212	FS212	4,24
65	184	149,0	38	22	58,0	18,0	77,7	65,1	25,4	M16	UCFS213	UC213	FS213	5,11
70	188	152,0	38	23	60,0	18,0	82,4	74,6	30,2	M16	UCFS214	UC214	FS214	5,30
75	200	152,4	41	24	62,0	20,0	85,5	77,8	33,3	M16	UCFS215	UC215	FS215	6,38

Note: Inch sizes available on request.

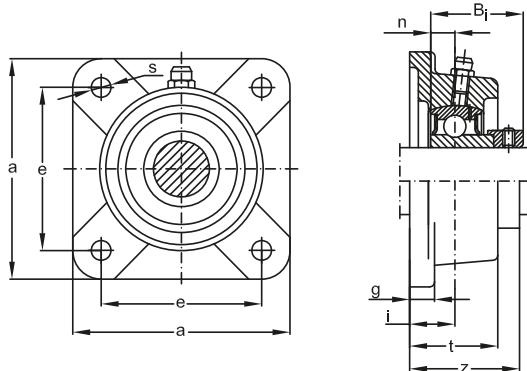
**Standard duty flanged units cast housing  
set screws type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass	
	a	e	i	g	t	s	z						
mm													
12	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF201	UC201 F204	0,57
15	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF202	UC202 F204	0,56
17	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF203	UC203 F204	0,55
20	86	64	15	12	25,5	12	33,3	31,0	12,7	M10	UCF204	UC204 F204	0,53
25	95	70	16	13	27	12	35,7	34,0	14,3	M10	UCF205	UC205 F205	0,74
30	108	83	18	13	31	12	40,2	38,1	15,9	M10	UCF206	UC206 F206	1,05
35	117	92	19	15	34	14	44,4	42,9	17,5	M12	UCF207	UC207 F207	1,34
40	130	102	21	15	36	16	51,2	49,2	19	M14	UCF208	UC208 F208	1,77
45	137	105	22	16	38	16	52,2	49,2	19	M14	UCF209	UC209 F209	2,05
50	143	111	22	16	40	16	54,6	51,6	19	M14	UCF210	UC210 F210	2,35
55	162	130	25	18	43	19	58,4	55,6	22,2	M16	UCF211	UC211 F211	3,00
60	175	143	29	18	48	19	68,7	65,1	25,4	M16	UCF212	UC212 F212	3,57
65	187	149	30	22	50	19	69,7	65,1	25,4	M16	UCF213	UC213 F213	4,92
70	193	152	31	22	54	19	75,4	74,6	30,2	M16	UCF214	UC214 F214	5,62
75	200	159	34	22	56	19	78,5	77,8	33,3	M16	UCF215	UC215 F215	5,55
80	208	165	34	24	58	23	83,3	82,6	33,3	M20	UCF216	UC216 F216	6,99
85	220	175	36	26	63	23	87,6	85,7	34,1	M20	UCF217	UC217 F217	8,58
90	235	187	40	26	68	23	96,3	96,0	39,7	M20	UCF218	UC218 F218	11,20

Note: Inch sizes available on request.

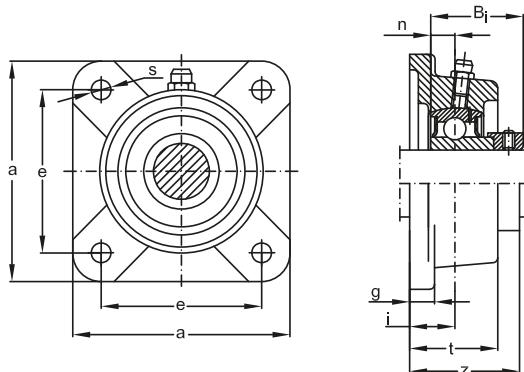
**Standard duty flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	z							
mm														
20	86	63,5	19	15	29,5	11,5	41,5	29,5	7,0	M10	SAFS204	SA204	FS204	0,64
25	93	70,0	19	15	30,0	11,5	42,0	30,5	7,5	M10	SAFS205	SA205	FS205	0,75
30	106	82,5	20	16	32,5	13,0	45,9	33,9	8,0	M12	SAFS206	SA206	FS206	1,02
35	116	92,0	21	17	35,0	13,0	50,0	37,5	8,5	M12	SAFS207	SA207	FS207	1,37
40	129	101,5	24	17	39,0	14,0	55,0	40,5	9,5	M12	SAFS208	SA208	FS208	1,75
45	135	105,0	24	18	40,0	16,0	56,2	42,2	10,0	M14	SAFS209	SA209	FS209	1,99
50	143	111,0	28	20	45,0	16,0	61,2	43,7	10,5	M14	SAFS210	SA210	FS210	2,43
55	162	130,0	31	21	49,0	17,0	67,9	48,4	11,5	M14	SAFS211	SA211	FS211	3,18

Note: Inch sizes available on request.

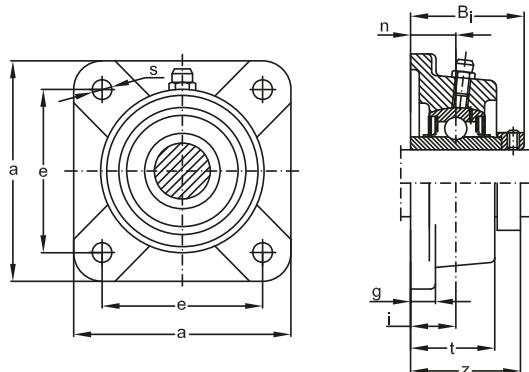
**Standard duty flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	z							
mm														
20	86	64	15	12	25,5	12	37,5	29,5	7,0	M10	SAF204	SA204	F204	0,54
25	95	70	16	13	27,0	12	39,0	30,5	7,5	M10	SAF205	SA205	F205	0,73
30	108	83	18	13	31,0	12	43,9	33,9	8,0	M10	SAF206	SA206	F206	1,06
35	117	92	19	15	34,0	14	48,0	37,5	8,5	M12	SAF207	SA207	F207	1,37
40	130	102	21	15	36,0	16	52,0	40,5	9,5	M14	SAF208	SA208	F208	1,78
45	137	105	22	16	38,0	16	54,2	42,2	10,0	M14	SAF209	SA209	F209	2,06
50	143	111	22	16	40,0	16	55,2	43,7	10,5	M14	SAF210	SA210	F210	2,35
55	162	130	25	18	43,0	19	61,9	48,4	11,5	M16	SAF211	SA211	F211	2,75

Note: Inch sizes available on request.

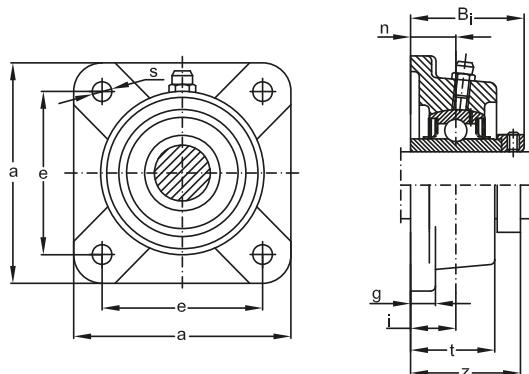
**Standard duty flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	z							
mm														
20	86	63,5	19	15	29,5	11,5	45,5	43,5	17	M10	UELFS204	UEL204	FS204	0,68
25	93	70	19	15	30	11,5	45,9	44,3	17,4	M10	UELFS205	UEL205	FS205	0,80
30	106	82,5	20	16	32,5	13,0	50,1	48,3	18,2	M12	UELFS206	UEL206	FS206	1,10
35	116	92	21	17	35	13	53,3	51,1	18,8	M12	UELFS207	UEL207	FS207	1,47
40	129	101,5	24	17	39	14	58,9	56,3	21,4	M12	UELFS208	UEL208	FS208	1,88
45	135	105	24	18	40	16	58,9	56,3	21,4	M14	UELFS209	UEL209	FS209	2,15
50	143	111	28	20	45	16	66,1	62,7	24,6	M14	UELFS210	UEL210	FS210	2,64
55	162	130	31	21	49	17	74,6	71,3	27,7	M14	UELFS211	UEL211	FS211	3,70
60	175	143	34	22	53,5	17	80,8	77,7	30,9	M14	UELFS212	UEL212	FS212	4,58
65	184	149	38	22	58	18	89,6	85,7	34,1	M16	UELFS213	UEL213	FS213	5,66
70	188	152	38	23	60	18	89,6	85,7	34,1	M16	UELFS214	UEL214	FS214	5,82
75	200	152,4	41	24	62	20	95,8	92,1	37,3	M16	UELFS215	UEL215	FS215	7,01

Note: Inch sizes available on request.

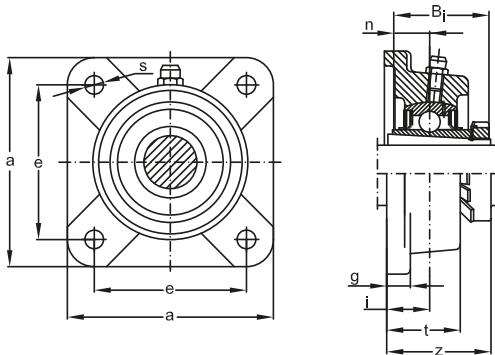
**Standard duty flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	z							
mm														
12	86	64	15	12	25,5	12	41,5	43,5	17	M10	UEL201	UEL201	F204	0,63
15	86	64	15	12	25,5	12	41,5	43,5	17	M10	UEL202	UEL202	F204	0,61
17	86	64	15	12	25,5	12	41,5	43,5	17	M10	UEL203	UEL203	F204	0,60
20	86	64	15	12	25,5	12	41,5	43,5	17	M10	UEL204	UEL204	F204	0,58
25	95	70	16	13	27	12	42,9	44,3	17,4	M10	UEL205	UEL205	F205	0,78
30	108	83	18	13	31	12	48,1	48,3	18,2	M10	UEL206	UEL206	F206	1,14
35	117	92	19	15	34	14	51,3	51,1	18,8	M12	UEL207	UEL207	F207	1,47
40	130	102	21	15	36	16	55,9	56,3	21,4	M14	UEL208	UEL208	F208	1,91
45	137	105	22	16	38	16	56,9	56,3	21,4	M14	UEL209	UEL209	F209	2,22
50	143	111	22	16	40	16	60,1	62,7	24,6	M14	UEL210	UEL210	F210	2,56
55	162	130	25	18	43	19	68,6	71,3	27,7	M16	UEL211	UEL211	F211	3,27
60	175	143	29	18	48	19	75,8	77,7	30,9	M16	UEL212	UEL212	F212	3,91
65	187	149	30	22	50	19	81,6	85,7	34,1	M16	UEL213	UEL213	F213	5,47
70	193	152	31	22	54	19	82,6	85,7	34,1	M16	UEL214	UEL214	F214	6,14
75	200	159	34	22	56	19	88,8	92,1	37,3	M16	UEL215	UEL215	F215	6,18

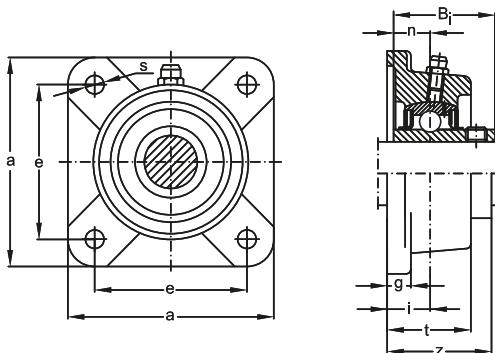
Note: Inch sizes available on request.

**Standard duty flanged units cast housing  
adapter type**



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	i	g	t	s	z	Bi					
mm													
<b>20</b>	95	70	16	13	27	12	35,5	35	M10	<b>UKF205</b>	<b>UK205</b>	<b>F205</b>	0.68
<b>25</b>	108	83	18	13	31	12	39,0	38	M10	<b>UKF206</b>	<b>UK206</b>	<b>F206</b>	0.98
<b>30</b>	117	92	19	15	34	14	42,5	43	M12	<b>UKF207</b>	<b>UK207</b>	<b>F207</b>	1.24
<b>35</b>	130	102	21	15	36	16	46,5	46	M14	<b>UKF208</b>	<b>UK208</b>	<b>F208</b>	1.61
<b>40</b>	137	105	22	16	38	16	48,5	50	M14	<b>UKF209</b>	<b>UK209</b>	<b>F209</b>	1.90
<b>45</b>	143	111	22	16	40	16	50,0	55	M14	<b>UKF210</b>	<b>UK210</b>	<b>F210</b>	2.14
<b>50</b>	162	130	25	18	43	19	54,5	59	M16	<b>UKF211</b>	<b>UK211</b>	<b>F211</b>	2.65
<b>55</b>	175	143	29	18	48	19	61,0	62	M16	<b>UKF212</b>	<b>UK212</b>	<b>F212</b>	3.07
<b>60</b>	187	149	30	22	50	19	64,0	65	M16	<b>UKF213</b>	<b>UK213</b>	<b>F213</b>	4.42

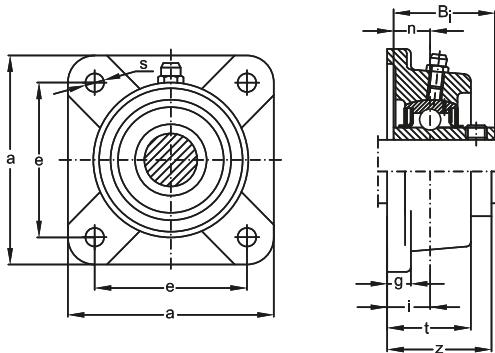
## Medium duty flanged units cast housing set screws type



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass	
	a	e	i	g	t	s	z	Bi						
mm														
<b>25</b>	108	82,5	18	13	30	12	40,2	38,1	15,9	M10	<b>UCFX05</b>	<b>UCX05</b>	<b>FX05</b>	1,15
<b>30</b>	117	92,0	19	14	34	16	44,4	42,9	17,5	M14	<b>UCFX06</b>	<b>UCX06</b>	<b>FX06</b>	1,50
<b>35</b>	130	101,5	21	14	38	16	51,2	49,2	19,0	M14	<b>UCFX07</b>	<b>UCX07</b>	<b>FX07</b>	1,97
<b>40</b>	137	105,0	22	14	40	19	52,2	49,2	19,0	M16	<b>UCFX08</b>	<b>UCX08</b>	<b>FX08</b>	2,18
<b>45</b>	143	111,0	23	14	40	19	55,6	51,6	19,0	M16	<b>UCFX09</b>	<b>UCX09</b>	<b>FX09</b>	2,37
<b>50</b>	162	130,0	26	20	44	19	59,4	55,6	22,2	M16	<b>UCFX10</b>	<b>UCX10</b>	<b>FX10</b>	3,47
<b>55</b>	175	143,0	29	20	49	19	68,7	65,1	25,4	M16	<b>UCFX11</b>	<b>UCX11</b>	<b>FX11</b>	4,13
<b>60</b>	187	149	34	21	59	19	73,7	65,1	25,4	M16	<b>UCFX12</b>	<b>UCX12</b>	<b>FX12</b>	5,70
<b>65</b>	187	149	34	21	59	19	78,4	74,6	30,2	M18	<b>UCFX13</b>	<b>UCX13</b>	<b>FX13</b>	5,77
<b>70</b>	197	152	37	24	60	23	81,5	77,8	33,3	M20	<b>UCFX14</b>	<b>UCX14</b>	<b>FX14</b>	6,79
<b>75</b>	197	152	40	24	68	23	89,3	82,6	33,3	M20	<b>UCFX15</b>	<b>UCX15</b>	<b>FX15</b>	7,66
<b>80</b>	214	171	40	24	70	23	91,6	85,7	34,1	M20	<b>UCFX16</b>	<b>UCX16</b>	<b>FX16</b>	9,99

Note: Inch sizes available on request.

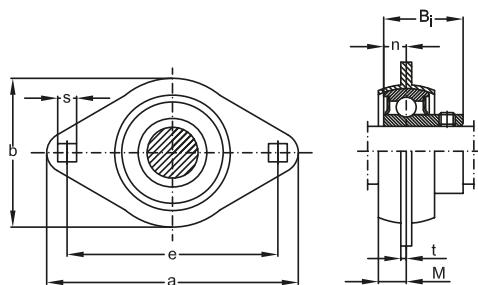
## Heavy duty flanged units cast housing set screws type



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass	
	a	e	i	g	t	s	z	Bi						
mm														
25	108	80	16	13	29	16	39	38	15	M14	UCF305	UC305	F305	1,01
30	125	95	18	15	32	16	44	43	17	M14	UCF306	UC306	F306	1,53
35	135	100	20	16	36	19	49	48	19	M16	UCF307	UC307	F307	1,86
40	150	112	23	17	40	19	56	52	19	M16	UCF308	UC308	F308	2,65
45	160	125	25	18	44	19	60	57	22	M16	UCF309	UC309	F309	3,21
50	175	132	28	20	48	23	67	61	22	M20	UCF310	UC310	F310	4,32
55	185	140	30	20	52	23	71	66	25	M20	UCF311	UC311	F311	5,24
60	193	150	33	22	56	23	78	71	26	M20	UCF312	UC312	F312	6,40
65	208	166	33	22	58	23	78	75	30	M20	UCF313	UC313	F313	7,54
70	226	178	36	25	61	25	81	78	33	M22	UCF314	UC314	F314	9,02
75	236	184	39	25	66	25	89	82	32	M22	UCF315	UC315	F315	10,45
80	250	196	38	27	68	31	90	86	34	M27	UCF316	UC316	F316	14,00

Note: Inch sizes available on request.

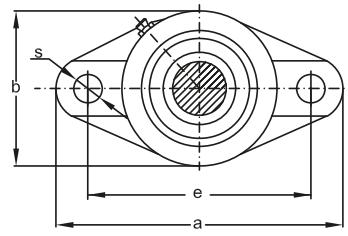
**Standard duty two bolts flanged units pressed steel  
housing set screws type**



Shaft Nominal dia. dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass	
a	e	M	t	s	b	Bi	n	-	Kg				
12	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL201	SB201	PFL203	0,18
15	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL202	SB202	PFL203	0,17
17	81	63,5	7,0	2,0	7,1	59	22	6	M6	SBPFL203	SB203	PFL203	0,16
20	90	71,5	8,0	2,0	9	67	25	7	M8	SBPFL204	SB204	PFL204	0,22
25	95	76,0	9,0	2,0	9	71	27	7,5	M8	SBPFL205	SB205	PFL205	0,27
30	113	90,5	9,5	2,6	11	84	29	8	M10	SBPFL206	SB206	PFL206	0,44
35	122	100	11	2,6	11	94	32	8,5	M10	SBPFL207	SB207	PFL207	0,58

Note: Inch sizes available on request.

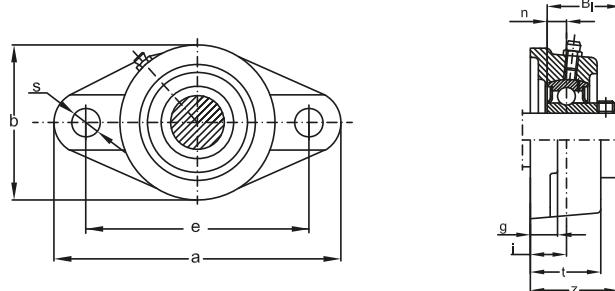
**Standard duty two bolts flanged units cast housing  
set screws type**



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass number		
	a	e	i	g	t	s	b	z							
mm															
20	112,5	90	19	15	29,5	10	61	37	25	7	M8	<b>SBFT204</b>	<b>SB204</b>	<b>FT204</b>	0,40
25	123	99	19	15	30	11,5	70	38,5	27	7,5	M10	<b>SBFT205</b>	<b>SB205</b>	<b>FT205</b>	0,56
30	142	116,5	20	16	32,5	11,5	82	41	29	8	M10	<b>SBFT206</b>	<b>SB206</b>	<b>FT206</b>	0,79
35	158	130	21	17	36	13	94	44,5	32	8,5	M10	<b>SBFT207</b>	<b>SB207</b>	<b>FT207</b>	1,18
40	172	143,5	24	17	39	13	103	48,5	34	9,5	M10	<b>SBFT208</b>	<b>SB208</b>	<b>FT208</b>	1,35

Note: Inch sizes available on request.

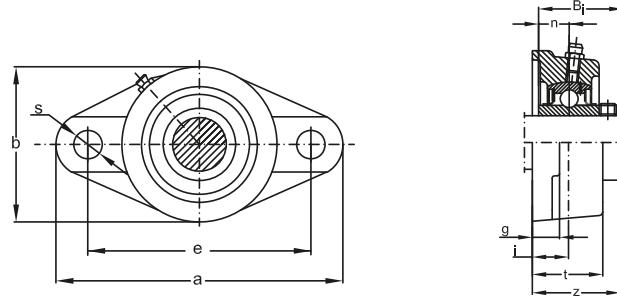
## Standard duty two bolts flanged units cast housing set screws type



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass number		
	a	e	i	g	t	s	b	z							
mm															
20	113	90	15	11	25,5	12	60	33	25	7	M10	<b>SBFL204</b>	<b>SB204</b>	<b>FL204</b>	0,39
25	130	99	16	13	27	16	68	35,5	27	7,5	M14	<b>SBFL205</b>	<b>SB205</b>	<b>FL205</b>	0,56
30	148	117	18	13	31	16	80	39	29	8	M14	<b>SBFL206</b>	<b>SB206</b>	<b>FL206</b>	0,85
35	161	130	19	14	34	16	90	42,5	32	8,5	M14	<b>SBFL207</b>	<b>SB207</b>	<b>FL207</b>	1,05
40	175	144	21	14	36	16	100	45,5	34	9,5	M14	<b>SBFL208</b>	<b>SB208</b>	<b>FL208</b>	1,29

Note: Inch sizes available on request.

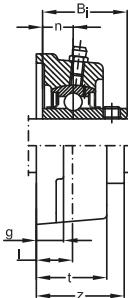
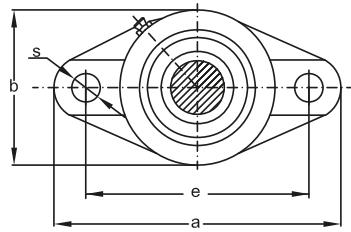
## Standard duty two bolts flanged units cast housing set screws type



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	b	z							
mm															
20	112,5	90	19	15	29,5	10	61	37,3	31	12,7	M8	UCFT204	UC204	FT204	0,51
25	123	99	19	15	30	11,5	70	38,7	34	14,3	M10	UCFT205	UC205	FT205	0,60
30	142	116,5	20	16	32,5	11,5	82	42,2	38,1	15,9	M10	UCFT206	UC206	FT206	0,85
35	158	130	21	17	36	13	94	46,4	42,9	17,5	M10	UCFT207	UC207	FT207	1,27
40	172	143,5	24	17	39	13	103	54,2	49,2	19	M10	UCFT208	UC208	FT208	1,49
45	180	148,5	24	18	40	15	108	54,2	49,2	19	M12	UCFT209	UC209	FT209	1,71
50	190	157	28	20	45	15	114	60,6	51,6	19	M12	UCFT210	UC210	FT210	1,97
55	217	184	31	21	48	16,5	128	64,4	55,6	22,2	M14	UCFT211	UC211	FT211	2,79
60	237	202	34	21	53	16,5	138	73,7	65,1	25,4	M14	UCFT212	UC212	FT212	3,62
65	256	210	38	22	56	21	152	77,7	65,1	25,4	M20	UCFT213	UC213	FT213	4,51
70	264	216	38	23	58	21	157	82,4	74,6	30,2	M20	UCFT214	UC214	FT214	4,81

Note: Inch sizes available on request.

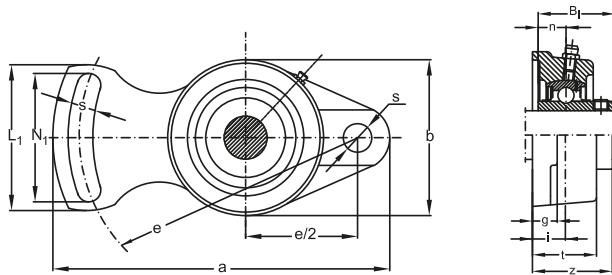
## Standard duty two bolts flanged units cast housing set screws type



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass		
	a	e	i	g	t	s	b	z							
mm															
12	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL201	UC201	FL201	0,47
15	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL202	UC202	FL202	0,46
17	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL203	UC203	FL203	0,45
20	113	90	15	11	25,5	12	60	33,3	31	12,7	M10	UCFL204	UC204	FL204	0,43
25	130	99	16	13	27	16	68	35,7	34	14,3	M14	UCFL205	UC205	FL205	0,60
30	148	117	18	13	31	16	80	40,2	38,1	15,9	M14	UCFL206	UC206	FL206	0,91
35	161	130	19	14	34	16	90	44,4	42,9	17,5	M14	UCFL207	UC207	FL207	1,14
40	175	144	21	14	36	16	100	51,2	49,2	19	M14	UCFL208	UC208	FL208	1,43
45	188	148	22	16	38	19	108	52,2	49,2	19	M16	UCFL209	UC209	FL209	1,80
50	197	157	22	16	40	19	115	54,6	51,6	19	M16	UCFL210	UC210	FL210	2,13
55	224	184	25	18	43	19	130	58,4	55,6	22,2	M16	UCFL211	UC211	FL211	2,86
60	250	202	29	18	48	23	140	68,7	65,1	25,4	M20	UCFL212	UC212	FL212	3,76
65	258	210	30	20	50	23	155	69,7	65,1	25,4	M20	UCFL213	UC213	FL213	4,63
70	265	216	31	20	54	23	160	75,4	74,6	30,2	M20	UCFL214	UC214	FL214	5,22
75	275	225	34	20	56	23	165	78,5	77,8	33,3	M20	UCFL215	UC215	FL215	5,36
80	290	233	34	22	58	25	180	83,3	82,6	33,3	M22	UCFL216	UC216	FL216	6,99
85	305	248	36	22	63	25	190	87,6	85,7	34,1	M22	UCFL217	UC217	FL217	8,28
90	320	265	40	23	68	25	205	96,3	96	39,7	M22	UCFL218	UC218	FL218	10,7

Note: Inch sizes available on request.

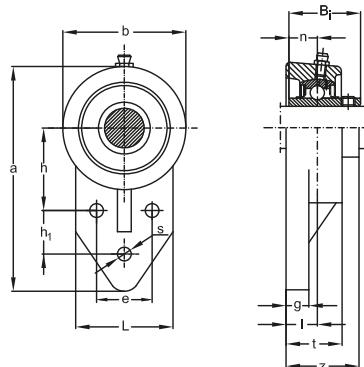
## Standard duty flanged units cast housing special type set screws type



Shaft Nominal dia.	dimensions	a	e	i	g	t	s	N <sub>1</sub>	b	L <sub>1</sub>	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
														M8	-	UCFA201	UC201	FA201
12	102 78 15 12 25,5 10 40 60 54 33,3 31 12,7	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA201	UC201	FA201	0,49
15	102 78 15 12 25,5 10 40 60 54 33,3 31 12,7	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA202	UC202	FA202	0,48
17	102 78 15 12 25,5 10 40 60 54 33,3 31 12,7	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA203	UC203	FA203	0,47
20	102 78 15 12 25,5 10 40 60 54 33,3 31 12,7	102	78	15	12	25,5	10	40	60	54	33,3	31	12,7	M8	UCFA204	UC204	FA204	0,45
25	125 98 16 14 27 12 51 68 65 34,7 34 14,3	125	98	16	14	27	12	51	68	65	34,7	34	14,3	M10	UCFA205	UC205	FA205	0,64
30	144 117 18 14 31 12 58 80 72 40,2 38,1 15,9	144	117	18	14	31	12	58	80	72	40,2	38,1	15,9	M10	UCFA206	UC206	FA206	0,92
35	161 130 19 16 34 14 66 90 82 45,4 42,9 17,5	161	130	19	16	34	14	66	90	82	45,4	42,9	17,5	M12	UCFA207	UC207	FA207	1,27
40	175 144 21 16 36 14 71 100 87 52,2 49,2 19	175	144	21	16	36	14	71	100	87	52,2	49,2	19	M12	UCFA208	UC208	FA208	1,62
45	178 146 22 16 38 16 72 108 88 52,2 49,2 19	178	146	22	16	38	16	72	108	88	52,2	49,2	19	M14	UCFA209	UC209	FA209	1,84
50	188 155 22 16 39 16 75 114 92 54,6 51,6 19	188	155	22	16	39	16	75	114	92	54,6	51,6	19	M14	UCFA210	UC210	FA210	2,10
55	216 182 25 18 42,5 16 84 128 102 58,4 55,6 22,2	216	182	25	18	42,5	16	84	128	102	58,4	55,6	22,2	M14	UCFA211	UC211	FA211	2,16
60	238 202 29 19 47,5 18 104 140 122 68,7 65,1 25,4	238	202	29	19	47,5	18	104	140	122	68,7	65,1	25,4	M16	UCFA212	UC212	FA212	2,92
65	248 210 30 20 49 18 106 152 126 69,7 65,1 25,4	248	210	30	20	49	18	106	152	126	69,7	65,1	25,4	M16	UCFA213	UC213	FA213	3,61

Note: Inch sizes available on request.

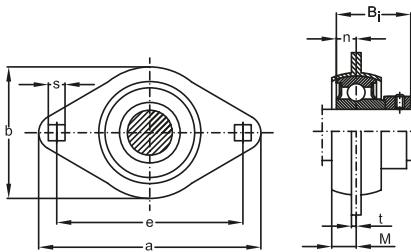
**Standard duty flanged units cast housing special type  
set screws type**



Shaft Nominal dia.	dimensions	a	e	i	g	t	s	h	h <sub>1</sub>	L	b	z	B <sub>i</sub>	n	Bolt Unit size	Bearing Housing number	Mass number
															Kg		
<b>12</b>	109 32 15 11 25,5 10 42 27 52 60 33,3 31 12,7 M8	<b>UCFB201</b>	<b>UC201</b>	<b>FB201</b>	0,53												
<b>15</b>	109 32 15 11 25,5 10 42 27 52 60 33,3 31 12,7 M8	<b>UCFB202</b>	<b>UC202</b>	<b>FB202</b>	0,52												
<b>17</b>	109 32 15 11 25,5 10 42 27 52 60 33,3 31 12,7 M8	<b>UCFB203</b>	<b>UC203</b>	<b>FB203</b>	0,51												
<b>20</b>	109 32 15 11 25,5 10 42 27 52 60 33,3 31 12,7 M8	<b>UCFB204</b>	<b>UC204</b>	<b>FB204</b>	0,49												
<b>25</b>	116 34 16 13 27 10 45 27 56 68 35,7 34 14,3 M8	<b>UCFB205</b>	<b>UC205</b>	<b>FB205</b>	0,66												
<b>30</b>	132 40 18 13 31 10 50 29 65 80 40,2 38,1 15,9 M8	<b>UCFB206</b>	<b>UC206</b>	<b>FB206</b>	0,99												
<b>35</b>	144 46 19 14 33 10 55 32 70 90 44,4 42,9 17,5 M8	<b>UCFB207</b>	<b>UC207</b>	<b>FB207</b>	1,21												
<b>40</b>	164 50 21 16 35 12 60 41 78 100 51,2 49,2 19 M10	<b>UCFB208</b>	<b>UC208</b>	<b>FB208</b>	1,72												
<b>45</b>	175 54 22 16 38 12 65 43 80 108 52,2 49,2 19 M10	<b>UCFB209</b>	<b>UC209</b>	<b>FB209</b>	1,86												
<b>50</b>	184 58 22 16 39 12 68 46 86 114 54,6 51,6 19 M10	<b>UCFB210</b>	<b>UC210</b>	<b>FB210</b>	2,36												
<b>55</b>	207 62 25 18 42,5 14 78 50 90 128 58,4 55,6 22,2 M12	<b>UCFB211</b>	<b>UC211</b>	<b>FB211</b>	3,11												
<b>60</b>	224 66 29 19 47,5 14 84 55 94 140 68,7 65,1 25,4 M12	<b>UCFB212</b>	<b>UC212</b>	<b>FB212</b>	4,07												
<b>65</b>	244 70 30 20 49 14 92 60 102 152 69,7 65,1 25,4 M12	<b>UCFB213</b>	<b>UC213</b>	<b>FB213</b>	4,86												

Note: Inch sizes available on request.

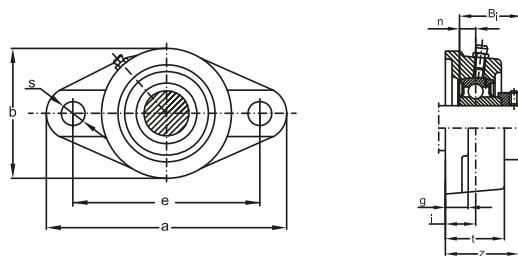
**Standard duty two bolts flanged units pressed steel  
housing eccentric locking collar type**



Shaft Nominal dimensions							Bolt size	Unit number	Bearing number	Housing number	Mass		
a	e	M	t	s	b	Bi	n	-	Kg				
mm													
12	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL201	SA201	PFL201	0,22
15	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL202	SA202	PFL202	0,21
17	81	63,5	7	2	7,1	59	28,5	6	M6	SAPFL203	SA203	PFL203	0,20
20	90	71,5	8	2	9	67	29,5	7	M8	SAPFL204	SA204	PFL204	0,27
25	95	76	9	2	9	71	30,5	7,5	M8	SAPFL205	SA205	PFL205	0,30
30	113	90,5	9,5	2,6	11	84	33,9	8	M10	SAPFL206	SA206	PFL206	0,51
35	122	100	11	2,6	11	94	37,5	8,5	M10	SAPFL207	SA207	PFL207	0,70

Note: Inch sizes available on request.

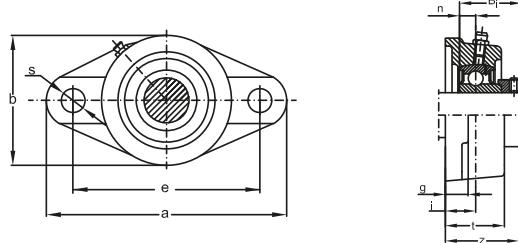
**Standard duty two bolts flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass number		
	a	e	i	g	t	s	b	z							
mm															
20	112,5	90	19	15	29,5	10	61	41,5	29,5	7	M8	SAFT204	SA204	FT204	0,52
25	123	99	19	15	30	11,5	70	42	30,5	7,5	M10	SAFT205	SA205	FT205	0,59
30	142	116,5	20	16	32,5	11,5	82	45,9	33,0	8	M10	SAFT206	SA206	FT206	0,86
35	158	130	21	17	36	13	94	50	37,5	8,5	M10	SAFT207	SA207	FT207	1,30
40	172	143,5	24	17	39	13	103	55	40,5	9,5	M10	SAFT208	SA208	FT208	1,50
45	180	148,5	24	18	40	15	108	56,2	42,2	10	M12	SAFT209	SA209	FT209	1,72
50	190	157	28	20	45	15	114	61,2	43,7	10,5	M12	SAFT210	SA210	FT210	1,97
55	217	184	31	21	48	16,5	128	67,9	48,4	11,5	M14	SAFT211	SA211	FT211	2,54

Note: Inch sizes available on request.

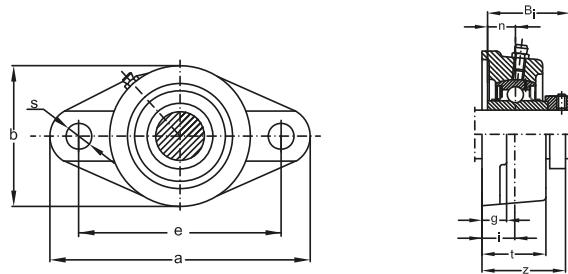
**Standard duty two bolts flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions								Bolt size	Unit number	Bearing number	Housing number	Mass number		
	a	e	i	g	t	s	b	z							
mm															
20	113	90	15	11	25,5	12	60	37,5	29,5	7	M10	<b>SAFL204</b>	<b>SA204</b>	<b>FL204</b>	0,44
25	130	99	16	13	27	16	68	39	30,5	7,5	M14	<b>SAFL205</b>	<b>SA205</b>	<b>FL205</b>	0,59
30	148	117	18	13	31	16	80	43,9	33,9	8	M14	<b>SAFL206</b>	<b>SA206</b>	<b>FL206</b>	0,92
35	161	130	19	14	34	16	90	48	37,5	8,5	M14	<b>SAFL207</b>	<b>SA207</b>	<b>FL207</b>	1,17
40	175	144	21	14	36	16	100	52	40,5	9,5	M14	<b>SAFL208</b>	<b>SA208</b>	<b>FL208</b>	1,44
45	188	148	22	16	38	19	108	54,2	42,2	10	M16	<b>SAFL209</b>	<b>SA209</b>	<b>FL209</b>	1,81
50	197	157	22	16	40	19	115	55,2	43,7	10,5	M16	<b>SAFL210</b>	<b>SA210</b>	<b>FL210</b>	2,13
55	224	184	25	18	43	19	130	61,9	48,4	11,5	M16	<b>SAFL211</b>	<b>SA211</b>	<b>FL211</b>	2,61

Note: Inch sizes available on request.

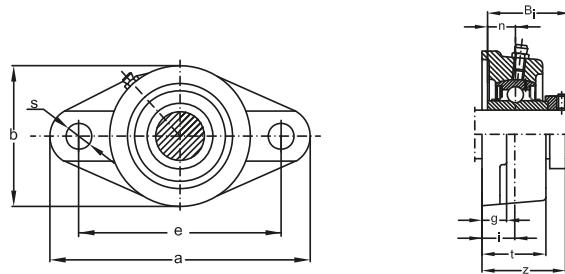
## Standard duty two bolts flanged units cast housing eccentric locking collar type



Shaft Nominal dia. dimensions	a	e	i	g	t	s	b	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
mm															
<b>20</b>	112,5	90	19	15	29,5	10	61	45,5	43,5	17	M8	<b>UELFT204</b>	<b>UEL204</b>	<b>FT204</b>	0,56
<b>25</b>	123	99	19	15	30	11,5	70	45,9	44,3	17,4	M10	<b>UELFT205</b>	<b>UEL205</b>	<b>FT205</b>	0,64
<b>30</b>	142	116,5	20	16	32,5	11,5	82	50,1	48,3	18,2	M10	<b>UELFT206</b>	<b>UEL206</b>	<b>FT206</b>	0,94
<b>35</b>	158	130	21	17	36	13	94	53,3	51,1	18,8	M10	<b>UELFT207</b>	<b>UEL207</b>	<b>FT207</b>	1,40
<b>40</b>	172	143,5	24	17	39	13	103	58,9	56,3	21,4	M10	<b>UELFT208</b>	<b>UEL208</b>	<b>FT208</b>	1,63
<b>45</b>	180	148,5	24	18	40	15	108	58,9	56,3	21,4	M12	<b>UELFT209</b>	<b>UEL209</b>	<b>FT209</b>	1,88
<b>50</b>	190	157	28	20	45	15	114	66,1	62,7	24,6	M12	<b>UELFT210</b>	<b>UEL210</b>	<b>FT210</b>	2,18
<b>55</b>	217	184	31	21	48	16,5	128	74,6	71,3	27,7	M14	<b>UELFT211</b>	<b>UEL211</b>	<b>FT211</b>	3,06
<b>60</b>	237	202	34	21	53	16,5	138	80,8	77,7	30,9	M14	<b>UELFT212</b>	<b>UEL212</b>	<b>FT212</b>	3,96
<b>65</b>	256	210	38	22	56	21	152	89,6	85,7	34,1	M20	<b>UELFT213</b>	<b>UEL213</b>	<b>FT213</b>	5,06
<b>70</b>	264	216	38	23	58	21	157	89,6	85,7	34,1	M20	<b>UELFT214</b>	<b>UEL214</b>	<b>FT214</b>	5,33

Note: Inch sizes available on request.

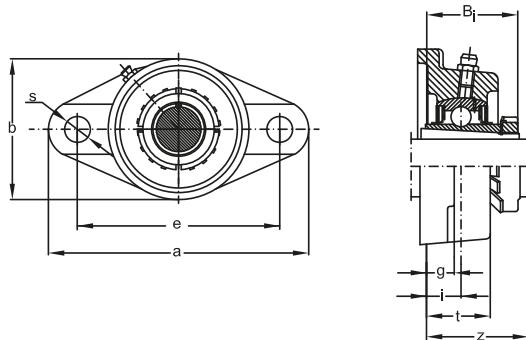
**Standard duty two bolts flanged units cast housing  
eccentric locking collar type**



Shaft Nominal dia. dimensions	a	e	i	g	t	s	b	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
											M10	UELFL201	UEL201	FL201	0,53
12	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL202	UEL202	FL202	0,51
15	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL203	UEL203	FL203	0,50
17	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL204	UEL204	FL204	0,48
20	113	90	15	11	25,5	60	12	41,5	43,5	17	M10	UELFL205	UEL205	FL205	0,64
25	130	99	16	13	27	68	16	42,9	44,3	17,4	M14	UELFL206	UEL206	FL206	1,00
30	148	117	18	13	31	80	16	48,1	48,3	18,2	M14	UELFL207	UEL207	FL207	1,27
35	161	130	19	14	34	90	16	51,3	51,1	18,8	M14	UELFL208	UEL208	FL208	1,57
40	175	144	21	14	36	100	16	55,9	56,3	21,4	M14	UELFL209	UEL209	FL209	1,97
45	188	148	22	16	38	108	19	56,9	56,3	21,4	M16	UELFL210	UEL210	FL210	2,34
50	197	157	22	16	40	115	19	60,1	62,7	24,6	M16	UELFL211	UEL211	FL211	3,13
55	224	184	25	18	43	130	19	68,6	71,3	27,7	M16	UELFL212	UEL212	FL212	4,10
60	250	202	29	18	48	140	23	75,8	77,3	30,9	M20	UELFL213	UEL213	FL213	5,18
65	258	210	30	20	50	155	23	81,6	85,7	34,1	M20	UELFL214	UEL214	FL214	5,74
70	265	216	31	20	54	160	23	82,6	85,7	34,1	M20	UELFL215	UEL215	FL215	5,99

Note: Inch sizes available on request.

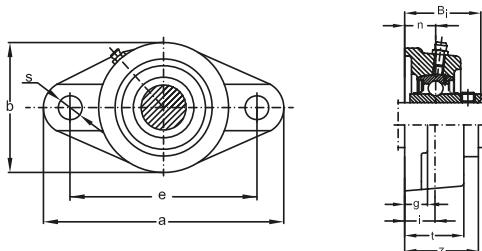
## Standard duty two bolts flanged units cast housing adapter type



Shaft dia.	Nominal dimensions	a	e	i	g	t	b	s	z	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass
mm															
<b>20</b>	130	99	16	13	27	68	16	35,5	35	M14	<b>UKFL205</b>	<b>UK205</b>	<b>FL205</b>	0,54	
<b>25</b>	148	117	18	13	31	80	16	39	38	M14	<b>UKFL206</b>	<b>UK206</b>	<b>FL206</b>	0,84	
<b>30</b>	161	130	19	14	34	90	16	42,5	43	M14	<b>UKFL207</b>	<b>UK207</b>	<b>FL207</b>	1,04	
<b>35</b>	175	144	21	14	36	100	16	46,5	46	M14	<b>UKFL208</b>	<b>UK208</b>	<b>FL208</b>	1,27	
<b>40</b>	188	148	22	16	38	108	19	48,5	50	M16	<b>UKFL209</b>	<b>UK209</b>	<b>FL209</b>	1,65	
<b>45</b>	197	157	22	16	40	115	19	50	55	M16	<b>UKFL210</b>	<b>UK210</b>	<b>FL210</b>	1,92	
<b>50</b>	224	184	25	18	43	130	19	54,5	59	M16	<b>UKFL211</b>	<b>UK211</b>	<b>FL211</b>	2,51	
<b>55</b>	250	202	29	18	48	140	23	61	62	M20	<b>UKFL212</b>	<b>UK212</b>	<b>FL212</b>	3,26	
<b>60</b>	258	210	30	20	50	155	23	64	65	M20	<b>UKFL213</b>	<b>UK213</b>	<b>FL213</b>	4,13	

Note: Inch sizes available on request.

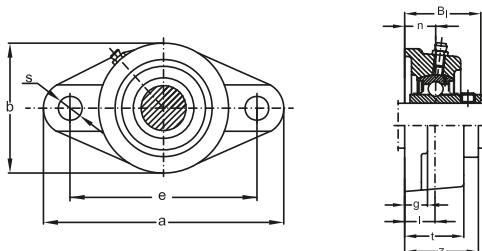
**Medium duty two bolts flanged units cast housing  
set screws type**



Shaft Nominal dia. dimensions	a	e	i	g	t	b	s	z	Bi	n	Bolt size	Unit number	Bearing number	Housing number	Mass
mm															
<b>25</b>	141	117	18	13	30	83	12	40,2	38,1	15,9	M10	<b>UCFLX05</b>	<b>UCX05</b>	<b>FLX05</b>	0,95
<b>30</b>	156	130	19	15	34	95	16	44,4	42,9	17,5	M14	<b>UCFLX06</b>	<b>UCX06</b>	<b>FLX06</b>	1,34
<b>35</b>	171	144	22	16	38	105	16	51,2	49,2	19	M14	<b>UCFLX07</b>	<b>UCX07</b>	<b>FLX07</b>	1,74
<b>40</b>	179	148	22	16	40	111	16	52,2	49,2	19	M14	<b>UCFLX08</b>	<b>UCX08</b>	<b>FLX08</b>	1,97
<b>45</b>	189	157	23	16	40	116	16	55,6	51,6	19	M14	<b>UCFLX09</b>	<b>UCX09</b>	<b>FLX09</b>	2,18
<b>50</b>	216	184	26	18	44	133	19	59,4	55,6	22,2	M16	<b>UCFLX10</b>	<b>UCX10</b>	<b>FLX10</b>	3,19

Note: Inch sizes available on request.

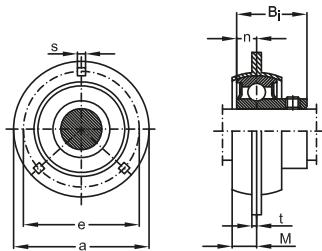
## Heavy duty two bolts flanged units cast housing set screws type



Shaft Nominal dia. dimensions	a	e	i	g	t	b	s	z	Bolt size	Unit number	Bearing number	Housing number	Mass number		
											M	UCFL	UC	FL	kg
<b>mm</b>															
<b>25</b>	150	113	16	13	29	80	19	39	38	15	M16	<b>UCFL305</b>	<b>UC305</b>	<b>FL305</b>	0,88
<b>30</b>	180	134	18	15	32	90	23	44	43	17	M20	<b>UCFL306</b>	<b>UC306</b>	<b>FL306</b>	1,34
<b>35</b>	185	141	20	16	36	100	23	49	48	19	M20	<b>UCFL307</b>	<b>UC307</b>	<b>FL307</b>	1,59
<b>40</b>	200	158	23	17	40	112	23	56	52	19	M20	<b>UCFL308</b>	<b>UC308</b>	<b>FL308</b>	2,11
<b>45</b>	230	177	25	18	44	125	25	60	57	22	M22	<b>UCFL309</b>	<b>UC309</b>	<b>FL309</b>	3,07
<b>50</b>	240	187	28	19	48	140	25	67	61	22	M22	<b>UCFL310</b>	<b>UC310</b>	<b>FL310</b>	3,83
<b>55</b>	250	198	30	20	52	150	25	71	66	25	M22	<b>UCFL311</b>	<b>UC311</b>	<b>FL311</b>	4,66
<b>60</b>	270	212	33	22	56	160	31	78	71	26	M27	<b>UCFL312</b>	<b>UC312</b>	<b>FL312</b>	5,59
<b>65</b>	295	240	33	25	58	175	31	78	75	30	M27	<b>UCFL313</b>	<b>UC313</b>	<b>FL313</b>	6,99
<b>70</b>	315	250	36	28	61	185	35	81	78	33	M30	<b>UCFL314</b>	<b>UC314</b>	<b>FL314</b>	8,42
<b>75</b>	320	260	39	30	66	195	35	89	82	32	M30	<b>UCFL315</b>	<b>UC315</b>	<b>FL315</b>	9,80
<b>80</b>	355	285	38	32	68	210	38	90	86	34	M33	<b>UCFL316</b>	<b>UC316</b>	<b>FL316</b>	13,00

Note: Inch sizes available on request.

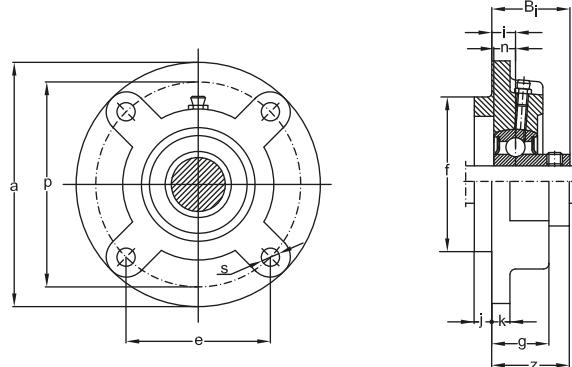
## Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions						Bolt size	Unit number	Bearing number	Housing number	Mass
	a	e	t	s	M	Bi	n				
mm											
<b>12</b>	81	63,5	2	7,1	7	22	6	M6	<b>SBPF203</b>	<b>SB201</b>	<b>PF201</b>
<b>15</b>	81	63,5	2	7,1	7	22	6	M6	<b>SBPF203</b>	<b>SB202</b>	<b>PF202</b>
<b>17</b>	81	63,5	2	7,1	7	22	6	M6	<b>SBPF203</b>	<b>SB203</b>	<b>PF203</b>
<b>20</b>	90	71,5	2	9	8	25	7	M8	<b>SBPF204</b>	<b>SB204</b>	<b>PF204</b>
<b>25</b>	95	76	2	9	9	27	7,5	M8	<b>SBPF205</b>	<b>SB205</b>	<b>PF205</b>
<b>30</b>	113	90,5	2,6	11	9,5	29	8	M10	<b>SBPF206</b>	<b>SB206</b>	<b>PF206</b>
<b>35</b>	122	100	2,6	11	11	32	8,5	M10	<b>SBPF207</b>	<b>SB207</b>	<b>PF207</b>

Note: Inch sizes available on request.

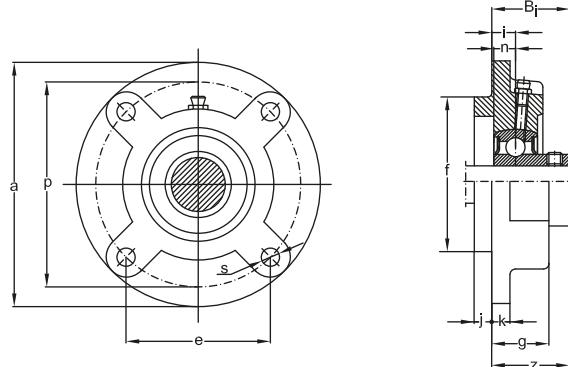
## Standard duty flanged cartridge units cast housing set screws type



Shaft dia.	Nominal dimensions	Bolt size	Unit number	Bearing number	Housing number	Mass
mm						
<b>20</b>	100 78 55,1 10 12 5 6 20,5 62 28 25 7 M10 <b>SB204</b>			<b>SBFC204</b>	<b>FC204</b>	0,65
<b>25</b>	115 90 63,6 10 12 6 7 21 70 29,5 27 7,5 M10 <b>SB205</b>			<b>SBFC205</b>	<b>FC205</b>	0,95
<b>30</b>	125 100 70,7 10 12 8 8 23 80 31 29 8 M10 <b>SB206</b>			<b>SBFC206</b>	<b>FC206</b>	1,19
<b>35</b>	135 110 77,8 11 14 9 9 26 90 34,5 32 8,5 M12 <b>SB207</b>			<b>SBFC207</b>	<b>FC 207</b>	1,55
<b>40</b>	145 120 84,8 11 14 9 9 26 100 35,5 34 9,5 M12 <b>SB208</b>			<b>SBFC208</b>	<b>FC208</b>	1,87

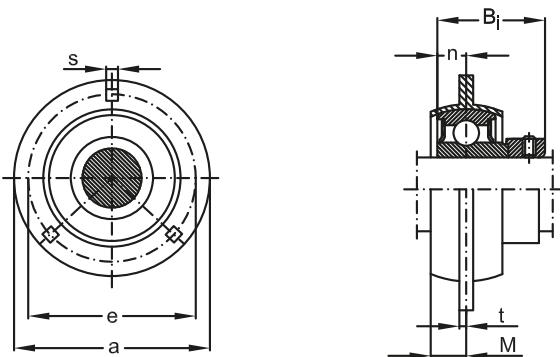
Note: Inch sizes available on request.

## Standard duty flanged cartridge units cast housing set screws type



Shaft Nominal dia.	dimensions										Bolt size	Unit number	Bearing number	Housing number	Mass		
mm																	
12	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC201	UC201	FC201	0,73
15	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC202	UC202	FC202	0,72
17	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC203	UC203	FC203	0,71
20	100	78	55,1	10	12	5	6	20,5	62	28,3	31	12,7	M10	UCFC204	UC204	FC204	0,69
25	115	90	63,6	10	12	6	7	21	70	29,7	34	14,3	M10	UCFC205	UC205	FC205	0,99
30	125	100	70,7	10	12	8	8	23	80	32,2	38,1	15,9	M10	UCFC206	UC206	FC206	1,25
35	135	110	77,8	11	14	8	9	26	90	36,4	42,9	17,5	M12	UCFC207	UC207	FC207	1,64
40	145	120	84,8	11	14	10	9	26	100	41,2	49,2	19	M12	UCFC208	UC208	FC208	2,01
45	160	132	93,3	10	16	12	10	26	105	40,2	49,2	19	M14	UCFC209	UC209	FC209	2,57
50	165	138	97,6	10	16	12	14	28	110	42,6	51,6	19	M14	UCFC210	UC210	FC210	2,85
55	185	150	106,1	13	19	12	13	30	125	46,4	55,6	22,2	M16	UCFC211	UC211	FC211	3,92
60	195	160	113,1	17	19	12	15	36	135	56,7	65,1	25,4	M16	UCFC212	UC212	FC212	5,03
65	205	170	120,2	16	19	14	15	35	145	55,7	65,1	25,4	M16	UCFC213	UC213	FC213	5,52
70	215	177	125,1	17	19	14	16	38	150	61,4	74,6	30,2	M16	UCFC214	UC214	FC214	6,55
75	220	184	130,1	18	19	16	17	39	160	62,5	77,8	33,3	M16	UCFC215	UC215	FC215	7,01
80	240	200	141,4	18	23	16	18	42	170	67,3	82,6	33,3	M20	UCFC216	UC216	FC216	8,94
85	250	208	147,1	18	23	18	20	45	180	69,6	85,7	34,1	M20	UCFC217	UC217	FC217	10,68
90	265	220	155,5	22	23	20	18	50	190	78,3	96	39,7	M20	UCFC218	UC218	FC218	12,95

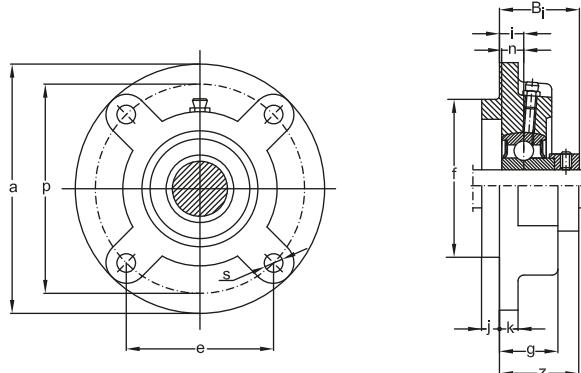
## Standard duty flanged cartridge units pressed steel housing set screws type



Shaft dia.	Nominal dimensions						Bolt size	Unit number	Bearing number	Housing number	Mass	
	a	e	t	s	M	B <sub>i</sub>						
mm												
<b>12</b>	81	63,5	2	7,1	7	28,5	6	M6	<b>SAPF201</b>	<b>SA201</b>	<b>PF201</b>	0,27
<b>15</b>	81	63,5	2	7,1	7	28,5	6	M6	<b>SAPF202</b>	<b>SA202</b>	<b>PF202</b>	0,26
<b>17</b>	81	63,5	2	7,1	7	28,5	6	M6	<b>SAPF203</b>	<b>SA203</b>	<b>PF203</b>	0,25
<b>20</b>	90	71,5	2	9	8	29,5	7	M8	<b>SAPF204</b>	<b>SA204</b>	<b>PF204</b>	0,34
<b>25</b>	95	76	2	9	9	30,5	7,5	M8	<b>SAPF205</b>	<b>SA205</b>	<b>PF205</b>	0,40
<b>30</b>	113	90,5	2,6	11	9,5	33,9	8	M10	<b>SAPF206</b>	<b>SA206</b>	<b>PF206</b>	0,65
<b>35</b>	122	100	2,6	11	11	37,5	8,5	M10	<b>SAPF207</b>	<b>SA207</b>	<b>PF207</b>	0,86

Note: Inch sizes available on request.

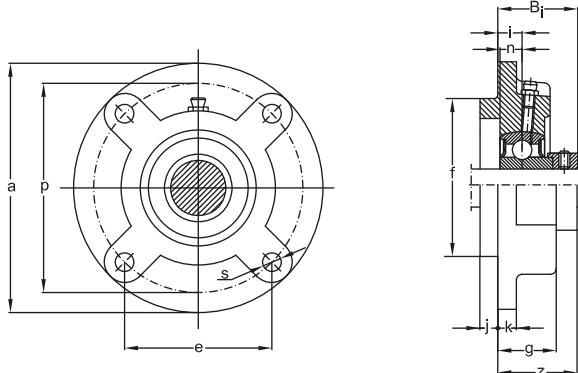
**Standard duty flanged cartridge units cast housing  
eccentric locking collar type**



Shaft Nominal dia.	dimensions	Bolt size	Unit number	Bearing number	Housing number	Mass
mm						
20	100 78 55,1 10 12 5 6 20,5 62 32,5 29,5 7 M10	SAFC204	SA204	FC204	0,70	
25	115 90 63,6 10 12 6 7 21 70 33 30,5 7,5 M10	SAFC205	SA205	FC205	0,98	
30	125 100 70,7 10 12 8 8 23 80 35,9 33,9 8 M10	SAFC206	SA206	FC206	1,26	
35	135 110 77,8 11 14 8 9 26 90 40 37,5 8,5 M12	SAFC207	SA207	FC207	1,67	
40	145 120 84,8 11 14 10 9 26 100 42 40,5 9,5 M12	SAFC208	SA208	FC208	2,02	
45	160 132 93,3 10 16 12 10 26 105 42,2 42,2 10 M14	SAFC209	SA209	FC209	2,58	
50	165 138 97,6 10 16 12 14 28 110 43,2 43,7 10,5 M14	SAFC210	SA210	FC210	2,85	
55	185 150 106,1 13 19 12 13 30 125 49,9 48,4 11,5 M16	SAFC211	SA211	FC211	3,67	

Note: Inch sizes available on request.

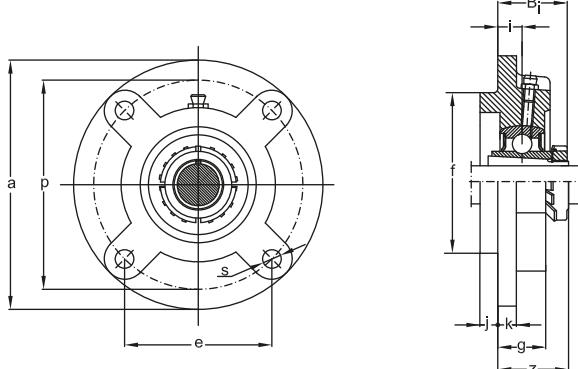
## Standard duty flanged cartridge units cast housing eccentric locking collar type



Shaft Nominal dia. dimensions	a	p	e	i	s	j	k	g	f	z	Bi	n	Bolt Unit size number	Bearing number	Housing number	Mass	
mm																	
<b>12</b>	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	<b>UELFC201</b>	<b>UEL201</b>	<b>FC201</b>	0,79
<b>15</b>	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	<b>UELFC202</b>	<b>UEL202</b>	<b>FC202</b>	0,77
<b>17</b>	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	<b>UELFC203</b>	<b>UEL203</b>	<b>FC203</b>	0,76
<b>20</b>	100	78	55,1	10	12	5	6	20,5	62	36,5	43,5	17	M10	<b>UELFC204</b>	<b>UEL204</b>	<b>FC204</b>	0,74
<b>25</b>	115	90	63,6	10	12	6	7	21	70	36,9	44,3	17,4	M10	<b>UELFC205</b>	<b>UEL205</b>	<b>FC205</b>	1,03
<b>30</b>	125	100	70,7	10	12	8	8	23	80	40,1	48,3	18,2	M10	<b>UELFC206</b>	<b>UEL206</b>	<b>FC206</b>	1,34
<b>35</b>	135	110	77,8	11	14	8	9	26	90	43,3	51,1	18,8	M12	<b>UELFC207</b>	<b>UEL207</b>	<b>FC207</b>	1,77
<b>40</b>	145	120	84,8	11	14	10	9	26	100	45,9	56,3	21,4	M12	<b>UELFC208</b>	<b>UEL208</b>	<b>FC208</b>	2,15
<b>45</b>	160	132	93,3	10	16	12	10	26	105	44,9	56,3	21,4	M14	<b>UELFC209</b>	<b>UEL209</b>	<b>FC209</b>	2,74
<b>50</b>	165	138	97,6	10	16	12	14	28	110	48,1	62,7	24,6	M14	<b>UELFC210</b>	<b>UEL210</b>	<b>FC210</b>	3,06
<b>55</b>	185	150	106,1	13	19	12	13	30	125	56,6	71,3	27,7	M16	<b>UELFC211</b>	<b>UEL211</b>	<b>FC211</b>	4,19
<b>60</b>	195	160	113,1	17	19	12	15	36	135	63,8	77,7	30,9	M16	<b>UELFC212</b>	<b>UEL212</b>	<b>FC212</b>	5,37
<b>65</b>	205	170	120,2	16	19	14	15	35	145	67,6	85,7	34,1	M16	<b>UELFC213</b>	<b>UEL213</b>	<b>FC213</b>	6,07
<b>70</b>	215	177	125,1	17	19	14	16	38	150	68,6	85,7	34,1	M16	<b>UELFC214</b>	<b>UEL214</b>	<b>FC214</b>	7,07
<b>75</b>	220	184	130,1	18	19	16	17	39	160	72,8	92,1	37,3	M16	<b>UELFC215</b>	<b>UEL215</b>	<b>FC215</b>	7,64

Note: Inch sizes available on request.

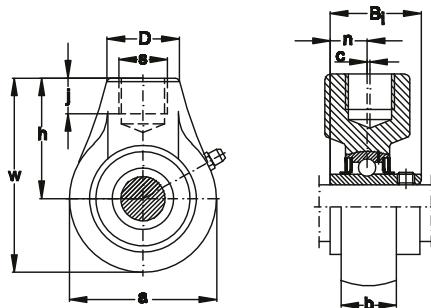
## Standard duty flanged cartridge units cast housing adapter type



Shaft Nominal dia.	dimensions	a	p	e	i	s	j	k	g	f	z	Bi	Bolt size	Unit number	Bearing number	Housing number	Mass
mm																	
20	115 90 63,6	115	90	63,6	10	12	6	7	21	70	29,5	35	M10	UKFC205	UK205	FC205	0,93
25	125 100 70,7	125	100	70,7	10	12	8	8	23	80	31	38	M10	UKFC206	UK206	FC206	1,18
30	135 110 77,8	135	110	77,8	11	14	8	9	26	90	34,5	43	M12	UKFC207	UK207	FC207	1,54
35	145 120 84,8	145	120	84,8	11	14	10	9	26	100	36,5	46	M12	UKFC208	UK208	FC208	1,85
40	160 132 93,3	160	132	93,3	10	16	12	10	26	105	36,5	50	M14	UKFC209	UK209	FC209	2,42
45	165 138 97,6	165	138	97,6	10	16	12	14	28	110	38	55	M14	UKFC210	UK210	FC210	2,64
50	185 150 106,1	185	150	106,1	13	19	12	13	30	125	42,5	59	M16	UKFC211	UK211	FC211	3,57
55	195 160 113,1	195	160	113,1	17	19	12	15	36	135	49	62	M16	UKFC212	UK212	FC212	4,53
60	205 170 120,2	205	170	120,2	16	19	14	15	35	145	50	65	M16	UKFC213	UK213	FC213	5,02

Note: Inch sizes available on request.

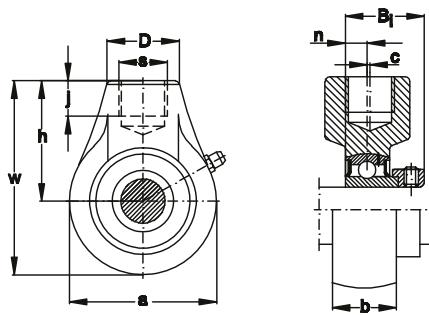
## Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions								Unit number	Bearing number	Housing number	Mass		
mm	a	w	c	b	h	s	n	D	j	Bi				
12	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA201	UC201	HA201	0,66
15	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA202	UC202	HA202	0,65
17	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA203	UC203	HA203	0,64
20	64	96	0	22	64	RP 3/4	40	19	31	12,7	UCHA204	UC204	HA204	0,62
25	78	103	0	23	64	RP 3/4	40	19	34	14,3	UCHA205	UC205	HA205	0,83
30	78	103	0	25	64	RP 3/4	40	19	38,1	15,9	UCHA206	UC206	HA206	0,78
35	92	116	0	26	70	RP 3/4	40	19	42,9	17,5	UCHA207	UC207	HA207	1,11
40	96	121	2	30	73	RP 3/4	40	19	49,2	19	UCHA208	UC208	HA208	1,25
45	108	136	5	30	82	RP 1	48	21	49,2	19	UCHA209	UC209	HA209	1,65
50	115	140,5	5	32	83	RP 1	48	21	51,6	19	UCHA210	UC210	HA210	1,95
55	126	150	7	33	87	RP 1-1/4	60	24	55,6	22,2	UCHA211	UC211	HA211	2,48
60	142	173	9	36	102	RP 1-1/4	60	28	65,1	25,4	UCHA212	UC212	HA212	3,59
65	166	200	9,5	38	117	RP 1-1/2	70	32	65,1	25,4	UCHA213	UC213	HA213	5,37
70	166	200	9,5	40	117	RP 1-1/2	70	32	74,6	30,2	UCHA214	UC214	HA214	5,47
75	166	200	9,5	40	117	RP 1-1/2	70	32	77,8	33,3	UCHA215	UC215	HA215	5,11

Note: Inch sizes available on request.

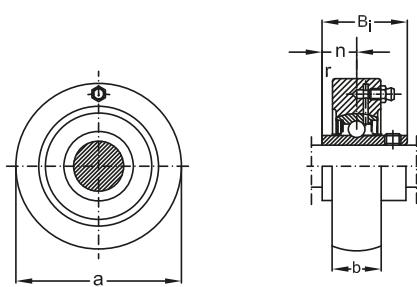
## Standard duty hanger units set screws type



Shaft dia.	Nominal dimensions							Unit number	Bearing number	Housing number	Mass
mm	a	w	c	b	h	s	n	D	j	Bi	
20	64	96	0	22	64	RP 3/4	40	19	29,5	7	SAHA204
25	78	103	0	23	64	RP 3/4	40	19	30,5	7,5	SAHA205
30	78	103	0	25	64	RP 3/4	40	19	33,9	8	SAHA206
35	92	116	0	26	70	RP 3/4	40	19	37,5	8,5	SAHA207
40	96	121	2	30	73	RP 3/4	40	19	40,5	9,5	SAHA208
45	108	136	5	30	82	RP 1	48	21	42,2	10	SAHA209
50	115	140,5	5	32	83	RP 1	48	21	43,7	10,5	SAHA210
55	126	150	7	33	87	RP 1-1/4	60	24	48,4	11,5	SAHA211

Note: Inch sizes available on request.

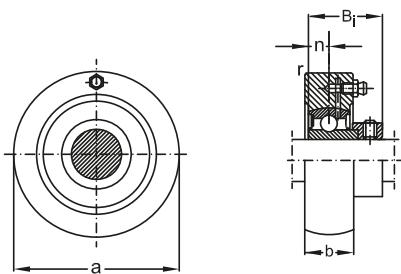
## Standard duty cylindrical cartridge units set screws type



Shaft Nominal dia.	dimensions				Unit number	Bearing number	Housing number	Mass	
mm	a	b	r	Bi	n	-	-	Kg	
<b>12</b>	72	20	2	31	12,7	<b>UCC201</b>	<b>UC201</b>	<b>C204</b>	0,53
<b>15</b>	72	20	2	31	12,7	<b>UCC202</b>	<b>UC202</b>	<b>C204</b>	0,52
<b>17</b>	72	20	2	31	12,7	<b>UCC203</b>	<b>UC203</b>	<b>C204</b>	0,51
<b>20</b>	72	20	2	31	12,7	<b>UCC204</b>	<b>UC204</b>	<b>C204</b>	0,49
<b>25</b>	80	22	2	34	14,3	<b>UCC205</b>	<b>UC205</b>	<b>C205</b>	0,65
<b>30</b>	85	27	2	38,1	15,9	<b>UCC206</b>	<b>UC206</b>	<b>C206</b>	0,81
<b>35</b>	90	28	2	42,9	17,5	<b>UCC207</b>	<b>UC207</b>	<b>C207</b>	0,90
<b>40</b>	100	30	2,5	49,2	19	<b>UCC208</b>	<b>UC208</b>	<b>C208</b>	1,19
<b>45</b>	110	31	2,5	49,2	19	<b>UCC209</b>	<b>UC209</b>	<b>C209</b>	1,49
<b>50</b>	120	33	2,5	51,6	19	<b>UCC210</b>	<b>UC210</b>	<b>C210</b>	1,92
<b>55</b>	125	35	2,5	55,6	22,2	<b>UCC211</b>	<b>UC211</b>	<b>C211</b>	2,21
<b>60</b>	130	38	2,5	65,1	25,4	<b>UCC212</b>	<b>UC212</b>	<b>C212</b>	2,48
<b>65</b>	140	40	3	65,1	25,4	<b>UCC213</b>	<b>UC213</b>	<b>C213</b>	2,97

Note: Inch sizes available on request.

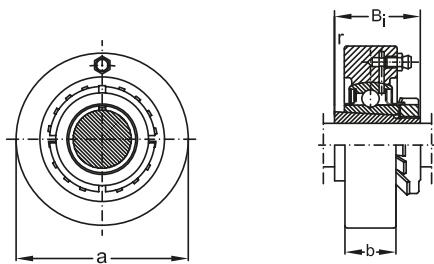
## Standard duty cylindrical cartridge units eccentric locking collar type



Shaft Nominal dimensions					Unit number	Bearing number	Housing number	Mass	
a	b	r	Bi	n	-			Kg	
mm									
<b>20</b>	72	20	2	7	29,5	<b>SAC204</b>	<b>SA204</b>	<b>C204</b>	0,50
<b>25</b>	80	22	2	7,5	30,5	<b>SAC205</b>	<b>SA205</b>	<b>C205</b>	0,64
<b>30</b>	85	27	2	8	33,9	<b>SAC206</b>	<b>SA206</b>	<b>C206</b>	0,82
<b>35</b>	90	28	2	8,5	37,5	<b>SAC207</b>	<b>SA207</b>	<b>C207</b>	0,93
<b>40</b>	100	30	2,5	9,5	40,5	<b>SAC208</b>	<b>SA208</b>	<b>C208</b>	1,20
<b>45</b>	110	31	2,5	10	42,2	<b>SAC209</b>	<b>SA209</b>	<b>C209</b>	1,50
<b>50</b>	120	33	2,5	10,5	43,7	<b>SAC210</b>	<b>SA210</b>	<b>C210</b>	1,92
<b>55</b>	125	35	2,5	11,5	48,4	<b>SAC211</b>	<b>SA211</b>	<b>C211</b>	1,96

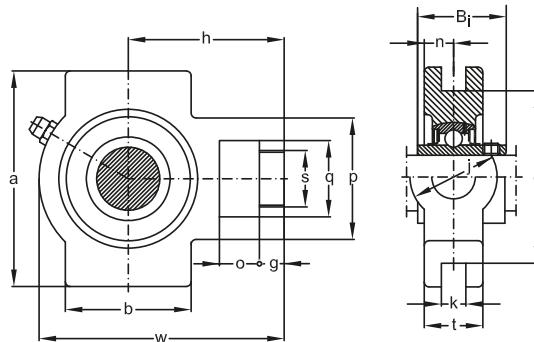
Note: Inch sizes available on request.

## Standard duty cylindrical cartridge units adapter type



Shaft Nominal dimensions				Unit number	Bearing number	Housing number	Mass
a	b	r	Bi				Kg
mm				-			
<b>20</b>	80	22	2	<b>UKC205</b>	<b>UK205</b>	<b>C205</b>	0,59
<b>25</b>	85	27	2	<b>UKC206</b>	<b>UK206</b>	<b>C206</b>	0,74
<b>30</b>	90	28	2	<b>UKC207</b>	<b>UK207</b>	<b>C207</b>	0,80
<b>35</b>	100	30	2,5	<b>UKC208</b>	<b>UK208</b>	<b>C208</b>	1,03
<b>40</b>	110	31	2,5	<b>UKC209</b>	<b>UK209</b>	<b>C209</b>	1,34
<b>45</b>	120	33	2,5	<b>UKC210</b>	<b>UK210</b>	<b>C210</b>	1,71
<b>50</b>	125	35	2,5	<b>UKC211</b>	<b>UK211</b>	<b>C211</b>	1,86
<b>55</b>	130	38	2,5	<b>UKC212</b>	<b>UK212</b>	<b>C212</b>	1,98
<b>60</b>	140	40	3	<b>UKC213</b>	<b>UK213</b>	<b>C213</b>	2,47

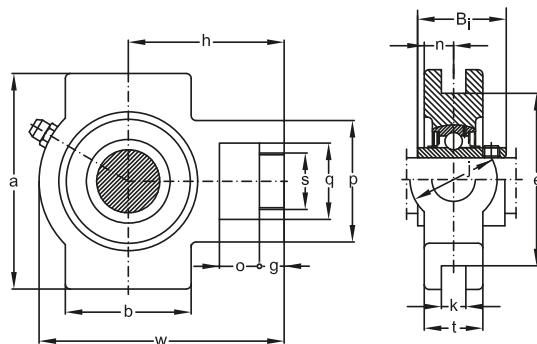
## Standard duty take-up units cast housing set screws type



Shaft Nominal dia. dimensions	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n	Unit number	Bearing number	Housing number	Mass
																-			Kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	31	12,7	UCST204	UC204	ST204	0,73
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	34	14,3	UCST205	UC205	ST205	0,83
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	38,1	15,9	UCST206	UC206	ST206	1,26
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	42,9	17,5	UCST207	UC207	ST207	1,58
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	49,2	19	UCST208	UC208	ST208	2,30
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	49,2	19	UCST209	UC209	ST209	2,27
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	51,6	19	UCST210	UC210	ST210	2,49
55	25	19	102	64	35	95	27	130	146	171	64	38	106	55,6	22,2	UCST211	UC211	ST211	3,77
60	32	19	102	64	35	102	27	130	146	194	64	42	119	65,1	25,4	UCST212	UC212	ST212	4,77
65	32	21	111	70	41	121	27	151	167	224	70	44	137	65,1	25,4	UCST213	UC213	ST213	6,65
70	32	21	111	70	41	121	27	151	167	224	70	46	137	74,6	30,2	UCST214	UC214	ST214	6,74
75	32	21	111	70	41	121	27	151	167	232	70	48	140	77,8	33,3	UCST215	UC215	ST215	7,10

Note: Inch sizes available on request.

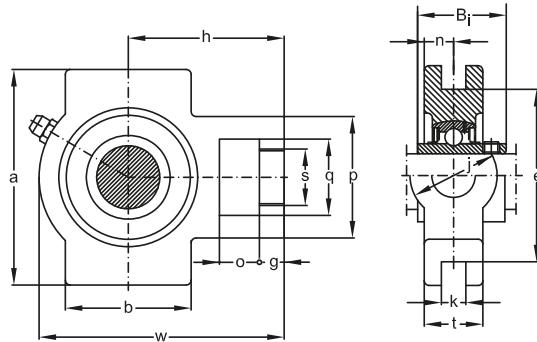
## Standard duty take-up units cast housing set screws type



Shaft Nominal dia. dimensions														Unit number	Bearing number	Housing number	Mass Kg		
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n				
mm																	-	Kg	
12	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT201	UC201	T204	0,70
15	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT202	UC202	T204	0,76
17	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT203	UC203	T204	0,75
20	16	10	51	32	19	51	12	76	89	94	32	21	61	31	12,7	UCT204	UC204	T204	0,73
25	16	10	51	32	19	51	12	76	89	97	32	24	62	34	14,3	UCT205	UC205	T205	0,83
30	16	10	56	37	22	57	12	89	102	113	37	28	70	38,1	15,9	UCT206	UC206	T206	1,26
35	16	13	64	37	22	64	12	89	102	129	37	30	78	42,9	17,5	UCT207	UC207	T207	1,58
40	19	16	83	49	29	83	16	102	114	144	49	33	88	49,2	19	UCT208	UC208	T208	2,31
45	19	16	83	49	29	83	16	102	117	144	49	35	87	49,2	19	UCT209	UC209	T209	2,28
50	19	16	83	49	29	86	16	102	117	149	49	37	90	51,6	19	UCT210	UC210	T210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	55,6	22,2	UCT211	UC211	T211	3,79
60	32	19	102	64	35	102	22	130	146	194	64	42	119	65,1	25,4	UCT212	UC212	T212	4,79
65	32	21	111	70	41	121	26	151	167	224	70	44	137	65,1	25,4	UCT213	UC213	T213	6,66
70	32	21	111	70	41	121	26	151	167	224	70	46	137	74,6	30,2	UCT214	UC214	T214	6,75
75	32	21	111	70	41	121	26	151	167	232	70	48	140	77,8	33,3	UCT215	UC215	T215	7,11
80	32	21	111	70	41	121	26	165	184	235	70	51	140	82,6	33,3	UCT216	UC216	T216	8,19
85	38	29	124	73	48	157	30	173	198	260	73	54	162	85,7	34,1	UCT217	UC217	T217	10,58

Note: Inch sizes available on request.

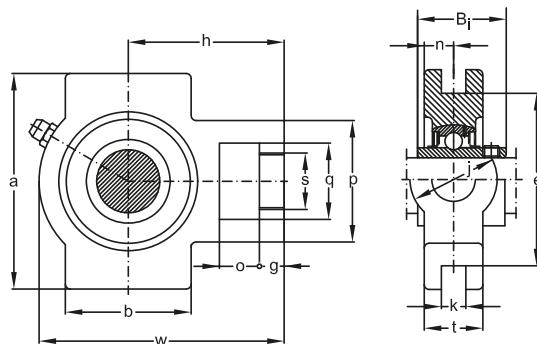
**Standard duty take-up units cast housing  
eccentric locking collar type**



Shaft Nominal dia. dimensions														Unit number	Bearing number	Housing number	Mass number									
	o	g	p	q	s	b	k	e	a	w	j	t	h	B <sub>i</sub>	n											
mm													-													Kg
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	29,5	7	SAST204	SA204	ST204	0,74							
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	30,5	7,5	SAST205	SA205	ST205	0,82							
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	33,9	8	SAST206	SA206	ST206	1,27							
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	37,5	8,5	SAST207	SA207	ST207	1,61							
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	40,5	9,5	SAST208	SA208	ST208	2,31							
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	42,2	10	SAST209	SA209	ST209	2,28							
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	43,7	10,5	SAST210	SA210	ST210	2,49							
55	25	19	102	64	35	95	27	130	146	171	64	38	106	48,4	11,5	SAST211	SA211	ST211	3,52							

Note: Inch sizes available on request.

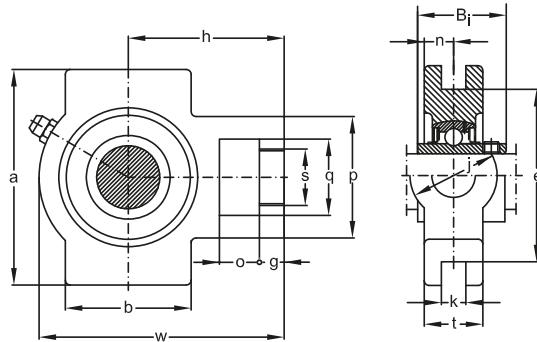
## Standard duty take-up units cast housing eccentric locking collar type



Shaft Nominal dia. dimensions	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n	Unit number	Bearing number	Housing number	Mass
																-			Kg
20	16	10	51	32	19	51	12	76	89	94	32	21	61	29,5	7	SAT204	SA204	T204	0,74
25	16	10	51	32	19	51	12	76	89	97	32	24	62	30,5	7,5	SAT205	SA205	T205	0,82
30	16	10	56	37	22	57	12	89	102	113	37	28	70	33,9	8	SAT206	SA206	T206	1,27
35	16	13	64	37	22	64	12	89	102	129	37	30	78	37,5	8,5	SAT207	SA207	T207	1,61
40	19	16	83	49	29	83	16	102	114	144	49	33	88	40,5	9,5	SAT208	SA208	T208	2,32
45	19	16	83	49	29	83	16	102	117	144	49	35	87	42,2	10	SAT209	SA209	T209	2,29
50	19	16	83	49	29	86	16	102	117	149	49	37	90	43,7	10,5	SAT210	SA210	T210	2,50
55	25	19	102	64	35	95	22	130	146	171	64	38	106	48,4	11,5	SAT211	SA211	T211	3,54

Note: Inch sizes available on request.

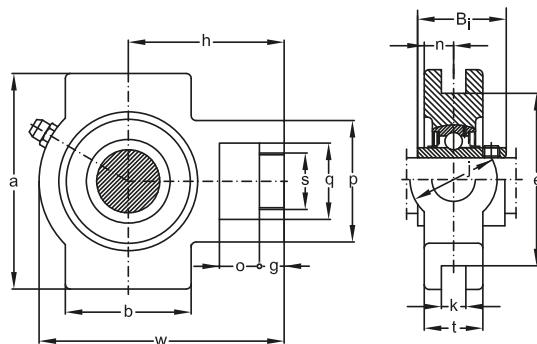
**Standard duty take-up units cast housing  
eccentric locking collar type**



Shaft Nominal dia. dimensions	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n	Unit number	Bearing number	Housing number	Mass number
																-	Kg		
mm																			
20	16	10	51	32	19	51	13,5	76	89	94	32	21	61	43,5	17	UELST204	UEL204	ST204	0,78
25	16	10	51	32	19	51	13,5	76	89	97	32	24	62	44,3	17,4	UELST205	UEL205	ST205	0,87
30	16	10	56	37	22	57	13,5	89	102	113	37	28	70	48,3	18,2	UELST206	UEL206	ST206	1,35
35	16	13	64	37	22	64	13,5	89	102	129	37	30	78	51,1	18,8	UELST207	UEL207	ST207	1,71
40	19	16	83	49	29	83	17,5	101	114	144	49	33	88	56,3	21,4	UELST208	UEL208	ST208	2,44
45	19	16	83	49	29	83	17,5	101	117	144	49	35	87	56,3	21,4	UELST209	UEL209	ST209	2,44
50	19	16	83	49	29	86	17,5	101	117	149	49	37	90	62,7	24,6	UELST210	UEL210	ST210	2,70
55	25	19	102	64	35	95	27	130	146	171	64	38	106	71,3	27,7	UELST211	UEL211	ST211	4,04
60	32	19	102	64	35	102	27	130	146	194	64	42	119	77,7	30,9	UELST212	UEL212	ST212	5,11
65	32	21	111	70	41	121	27	151	167	224	70	44	137	85,7	34,1	UELST213	UEL213	ST213	7,20
70	32	21	111	70	41	121	27	151	167	224	70	46	137	85,7	34,1	UELST214	UEL214	ST214	7,26
75	32	21	111	70	41	121	27	151	167	232	70	48	140	92,1	37,3	UELST215	UEL215	ST215	7,73

Note: Inch sizes available on request.

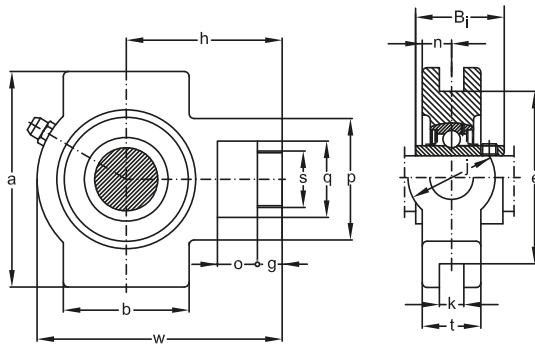
## Standard duty take-up units cast housing eccentric locking collar type



Shaft Nominal dia. dimensions														Unit number	Bearing number	Housing number	Mass number	
	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n			
mm													-	Kg				
12	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL201	UEL201 T204	0,83
15	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL202	UEL202 T204	0,81
17	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL203	UEL203 T204	0,80
20	16	12	51	32	19	51	12	76	89	94	32	21	61	43,5	17	UEL204	UEL204 T204	0,78
25	16	12	51	32	19	51	12	76	89	97	32	24	62	44,3	17,4	UEL205	UEL205 T205	0,87
30	16	12	56	37	22	57	12	89	102	113	37	28	70	48,3	18,2	UEL206	UEL206 T206	1,35
35	16	15	64	37	22	64	12	89	102	129	37	30	78	51,1	18,8	UEL207	UEL207 T207	1,71
40	19	18	83	49	29	83	16	102	114	144	49	33	88	56,3	21,4	UEL208	UEL208 T208	2,45
45	19	18	83	49	29	83	16	102	117	144	49	35	87	56,3	21,4	UEL209	UEL209 T209	2,45
50	19	18	83	49	29	86	16	102	117	149	49	37	90	62,7	24,6	UEL210	UEL210 T210	2,71
55	25	21	102	64	35	95	22	130	146	171	64	38	106	71,3	27,7	UEL211	UEL211 T211	4,06
60	32	21	102	64	35	102	22	130	146	194	64	42	119	77,7	30,9	UEL212	UEL212 T212	5,13
65	32	23	111	70	41	121	26	151	167	224	70	44	137	85,7	34,1	UEL213	UEL213 T213	7,21
70	32	23	111	70	41	121	26	151	167	224	70	46	137	85,7	34,1	UEL214	UEL214 T214	7,27
75	32	23	111	70	41	121	26	151	167	232	70	48	140	92,1	37,3	UEL215	UEL215 T215	7,74

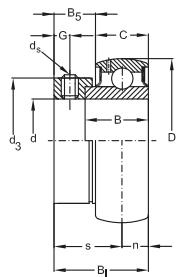
Note: Inch sizes available on request.

## Standard duty take-up units cast housing adapter type



Shaft Nominal dia. dimensions	o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	Unit number	Bearing number	Housing number	Mass Kg
															-	-	-	
mm															-	-	-	Kg
20	16	12	51	32	19	51	12	76	89	97	32	24	62	35	UKT205	UK205	T205	0,77
25	16	12	56	37	22	57	12	89	102	113	37	28	70	38	UKT206	UK206	T206	1,19
30	16	15	64	37	22	64	12	89	102	129	37	30	78	43	UKT207	UK207	T207	1,48
35	19	18	83	49	29	83	16	102	114	144	49	33	88	46	UKT208	UK208	T208	2,15
40	19	18	83	49	29	83	16	102	117	144	49	35	87	50	UKT209	UK209	T209	2,13
45	19	18	83	49	29	86	16	102	117	149	49	37	90	55	UKT210	UK210	T210	2,29
50	25	21	102	64	35	95	22	130	146	171	64	38	106	59	UKT211	UK211	T211	3,44
55	32	21	102	64	35	102	22	130	146	194	64	42	119	62	UKT212	UK212	T212	4,29
60	32	23	111	70	41	121	26	151	167	224	70	44	137	65	UKT213	UK213	T213	6,16

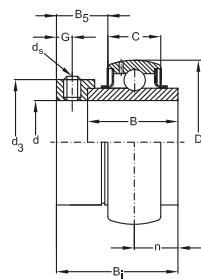
## Standard duty spherical outside surface ball bearings set screws type



Shaft dia. d	Nominal dimensions							Bearing number	Basic load ratings		Mass Kg
	D	Bi	C	n	s	G	d <sub>s</sub>		dyn. C <sub>r</sub>	stat. C <sub>or</sub>	
mm											
<b>12</b>	40	22	12	6	16	4	M5X0,8	<b>SB201</b>	9,6	4,6	0,10
<b>15</b>	40	22	12	6	16	4	M5X0,8	<b>SB202</b>	9,6	4,6	0,09
<b>17</b>	40	22	12	6	16	4	M5X0,8	<b>SB203</b>	9,6	4,6	0,08
<b>20</b>	47	25	14	7	18	5	M6X1	<b>SB204</b>	12,8	6,65	0,13
<b>25</b>	52	27	15	7,5	19,5	5,5	M6X1	<b>SB205</b>	14	7,85	0,17
<b>30</b>	62	29	16	8	21	6	M6X1	<b>SB206</b>	19,5	11,3	0,26
<b>35</b>	72	32	17	8,5	23,5	6,5	M6X1	<b>SB207</b>	25,7	15,3	0,38
<b>40</b>	80	34	19	9,5	24,5	7	M8X1	<b>SB208</b>	29,1	17,8	0,50

Note: Inch sizes available on request.

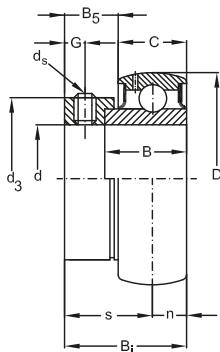
## Standard duty spherical outside surface ball bearings set screws type



Shaft dia. d	Nominal dimensions							Bearing number	Basic load ratings		Mass Kg
	D	Bi	C	n	s	G	F		dyn. $C_r$	stat. $C_{or}$	
mm											
<b>12</b>	47	31	16	12,7	18,3	5	3,5	M5X0,8	<b>UC201</b>	12,8	6,65
<b>15</b>	47	31	16	12,7	18,3	5	3,5	M5X0,8	<b>UC202</b>	12,8	6,65
<b>17</b>	47	31	16	12,7	18,3	5	3,5	M5X0,8	<b>UC203</b>	12,8	6,65
<b>20</b>	47	31	16	12,7	18,3	5	3,5	M6X1	<b>UC204</b>	12,8	6,65
<b>25</b>	52	34	17	14,3	19,7	5,5	4	M6X1	<b>UC205</b>	14	7,85
<b>30</b>	62	38,1	19	15,9	22,2	6	4,2	M6X1	<b>UC206</b>	19,5	11,3
<b>35</b>	72	42,9	20	17,5	25,4	6,5	4,3	M8X1	<b>UC207</b>	25,7	15,3
<b>40</b>	80	49,2	21	19	30,2	8	4,2	M8X1	<b>UC208</b>	29,1	17,8
<b>45</b>	85	49,2	22	19	30,2	8	4,2	M8X1	<b>UC209</b>	32,5	20,4
<b>50</b>	90	51,6	23	19	32,6	9	4,8	M10X1,25	<b>UC210</b>	35	23,2
<b>55</b>	100	55,6	25	22,2	33,4	9	5,3	M10X1,25	<b>UC211</b>	43,5	29,2
<b>60</b>	110	65,1	27	25,4	39,7	10,5	5,3	M10X1,25	<b>UC212</b>	52,5	36
<b>65</b>	120	65,1	28	25,4	39,7	12	6	M12X1,25	<b>UC213</b>	57,5	40
<b>70</b>	125	74,6	30	30,2	44,4	12	6	M12X1,25	<b>UC214</b>	62	44
<b>75</b>	130	77,8	30	33,3	44,5	12	6	M12X1,25	<b>UC215</b>	66	49,5
<b>80</b>	140	82,6	33	33,3	49,3	14	6,3	M12X1,25	<b>UC216</b>	72,5	53
<b>85</b>	150	85,7	35	34,1	51,6	14	6,5	M12X1,25	<b>UC217</b>	83,5	64
<b>90</b>	160	96	37	39,7	56,3	14	6,5	M12X1,25	<b>UC218</b>	96	71,5

Note: Inch sizes available on request.

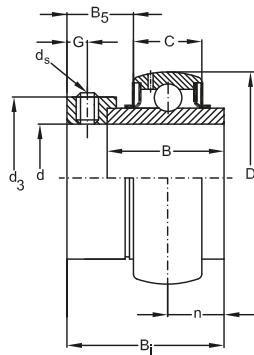
## Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft dia.	Nominal dimensions	d	D	Bi	B	C	n	s	G	ds	d <sub>3</sub>	B <sub>5</sub>	Bearing number	Basic load ratings		Mass	
														dyn C <sub>r</sub>	stat. C <sub>0r</sub>	kg	
mm																	
12	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA201	9,6	4,6	0,14			
15	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA202	9,6	4,6	0,13			
17	40	28,5	19	12	6	22,5	4,8	M6X1	28,6	13,5	SA203	9,6	4,6	0,12			
20	47	29,5	20	14	7	22,5	4,8	M6X1	33,3	13,5	SA204	12,8	6,65	0,18			
25	52	30,5	21	15	7,5	23	4,8	M6X1	38,1	13,5	SA205	14	7,85	0,20			
30	62	33,9	22	16	8	25,9	6	M6X1	44,5	15,9	SA206	19,5	11,3	0,33			
35	72	37,5	24	17	8,5	29	6,8	M8X1	55,6	17,5	SA207	25,7	15,3	0,50			
40	80	40,5	27	19	9,5	31	6,8	M8X1	60,3	18,3	SA208	29,1	17,8	0,65			
45	85	42,2	28,7	20	10	32,2	6,8	M8X1	63,5	18,3	SA209	32,5	20,4	0,69			
50	90	43,7	30,2	21	10,5	33,2	6,8	M8X1	69,9	18,3	SA210	35	23,2	0,80			
55	100	48,8	32,4	23	11,5	36,9	8	M10X1,25	76,2	18,3	SA211	43,5	29,2	0,87			

Note: Inch sizes available on request.

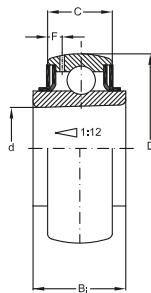
## Standard duty spherical outside surface ball bearings eccentric locking collar type



Shaft dia.	Nominal dimensions	d	D	B <sub>l</sub>	C	n	B	G	d <sub>3</sub>	B <sub>5</sub>	F	d <sub>s</sub>	Bearing number	Basic load ratings	Mass	
													-	dyn C <sub>r</sub>	stat. C <sub>0r</sub>	kg
mm																
<b>12</b>	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	<b>UEL201</b>	12,8	6,65	0,27		
<b>15</b>	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	<b>UEL202</b>	12,8	6,65	0,25		
<b>17</b>	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	<b>UEL203</b>	12,8	6,65	0,24		
<b>20</b>	47	43,5	16	17	34	4,8	33,3	13,5	3,5	M6X1	<b>UEL204</b>	12,8	6,65	0,22		
<b>25</b>	52	44,3	17	17,4	34,8	4,8	38,1	13,5	4	M6X1	<b>UEL205</b>	14	7,85	0,25		
<b>30</b>	62	48,3	19	18,2	36,4	6	44,5	15,9	4,2	M8X1	<b>UEL206</b>	19,5	11,3	0,41		
<b>35</b>	72	51,1	20	18,8	37,6	6,8	55,6	17,5	4,3	M8X1	<b>UEL207</b>	25,7	15,3	0,60		
<b>40</b>	80	56,3	21	21,4	42,8	6,8	60,3	18,3	4,2	M8X1	<b>UEL208</b>	29,1	17,8	0,78		
<b>45</b>	85	56,3	22	21,4	42,8	6,8	63,5	18,3	4,2	M8X1	<b>UEL209</b>	32,5	20,4	0,85		
<b>50</b>	90	62,7	23	24,6	49,2	6,8	69,9	18,3	4,8	M8X1	<b>UEL210</b>	35	23,2	1,01		
<b>55</b>	100	71,3	25	27,7	55,4	8	76,2	20,7	5,3	M10X1,25	<b>UEL211</b>	43,5	29,2	1,39		
<b>60</b>	110	77,7	27	30,9	61,8	8	84	22,3	5,3	M10X1,25	<b>UEL212</b>	52,5	36	1,87		
<b>65</b>	120	85,7	28	34,1	68,2	8,7	86	23,5	6	M10X1,25	<b>UEL213</b>	57,5	40	2,41		
<b>70</b>	125	85,7	30	34,1	68,2	8,7	96	23,9	6	M10X1,25	<b>UEL214</b>	62	44	2,57		
<b>75</b>	130	92,1	30	37,3	74,6	8,7	102	23,9	6	M10X1,25	<b>UEL215</b>	66	49,5	2,84		

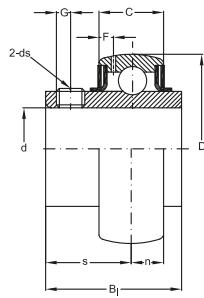
Note: Inch sizes available on request.

**Standard duty spherical outside surface  
ball bearings adapter type**



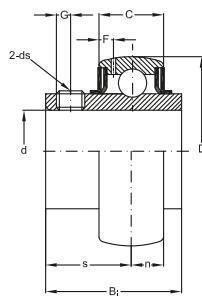
Shaft dia.	Nominal dimensions				Bearing number	Basic load ratings		Mass
	d	D	B <sub>i</sub>	C		dyn C <sub>r</sub>	stat. C <sub>0r</sub>	
mm					-	N		kg
<b>20</b>	52	21	17	4,2	<b>UK205</b>	14	7,85	0,15
<b>25</b>	62	25	19	4,5	<b>UK206</b>	19,5	11,3	0,25
<b>30</b>	72	27	20	4,2	<b>UK207</b>	25,7	15,3	0,37
<b>35</b>	80	29	21	4,2	<b>UK208</b>	29,1	17,8	0,48
<b>40</b>	85	30	22	4,2	<b>UK209</b>	32,5	20,4	0,53
<b>45</b>	90	31	23	5	<b>UK210</b>	35	23,2	0,59
<b>50</b>	100	33	27	6,3	<b>UK211</b>	43,5	29,2	0,77
<b>55</b>	110	36	27	5,3	<b>UK212</b>	52,5	36	1,03
<b>60</b>	120	36	28	6	<b>UK213</b>	57,5	40	1,36

## Medium duty spherical outside surface ball bearings set screws type



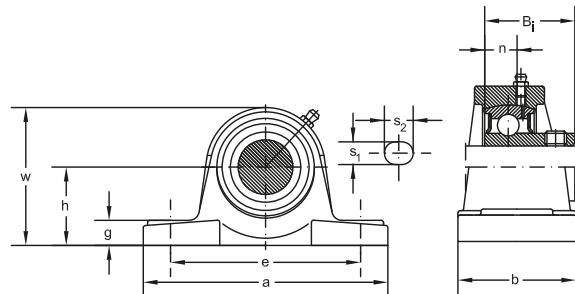
Shaft dia.	Nominal dimensions	Bearing number							Basic load ratings		Mass stat. $C_{0r}$	
		d	D	$B_i$	C	n	s	G	F	$d_s$		
mm												
<b>25</b>	62	38,1	19	15,9	22,2	6	5	M6X1	<b>UCX05</b>	19,5	11,3	0,39
<b>30</b>	72	42,9	22	17,5	25,4	6,5	5,8	M8X1	<b>UCX06</b>	25,7	15,3	0,58
<b>35</b>	80	49,2	21	19	30,2	8	6,3	M8X1	<b>UCX07</b>	29,1	17,8	0,74
<b>40</b>	85	49,2	22	19	30,2	8	6,8	M8X1	<b>UCX08</b>	32,5	20,4	0,83
<b>45</b>	90	51,6	23	19	32,6	9	6,5	M10X1,25	<b>UCX09</b>	35	23,2	0,95
<b>50</b>	100	55,6	25	22,2	33,4	9	7,2	M10X1,25	<b>UCX10</b>	43,5	29,2	1,29
<b>55</b>	110	65,1	27	25,4	39,7	10,5	8,2	M10X1,25	<b>UCX11</b>	52,5	36	1,80
<b>60</b>	120	65,1	28	25,4	39,7	12	8	M12X1,25	<b>UCX12</b>	57,5	40	2,05
<b>65</b>	125	74,6	30	30,2	44,4	12	9	M12X1,25	<b>UCX13</b>	62	44	2,52
<b>70</b>	130	77,8	30	33,3	44,5	12	9	M12X1,25	<b>UCX14</b>	66	49,5	2,74
<b>75</b>	140	82,6	33	33,3	49,3	14	10,3	M12X1,25	<b>UCX15</b>	72,5	53	3,41
<b>80</b>	150	85,7	35	34,1	51,6	14	11	M12X1,25	<b>UCX16</b>	83,2	63,8	3,87

## Heavy duty spherical outside surface ball bearings set screws type



Shaft dia.	Nominal dimensions	d	D	Bi	C	n	s	G	F	ds	Bearing number	Basic load ratings	Mass
											-	dyn C <sub>r</sub>	stat. C <sub>0r</sub>
mm													
<b>25</b>	62	38	21	15	23	6	4,3	M6X1	<b>UC305</b>	21,2	10,9	0,35	
<b>30</b>	72	43	24	17	26	6	5,5	M6X1	<b>UC306</b>	26,7	15	0,56	
<b>35</b>	80	48	25	19	29	8	5,3	M8X1	<b>UC307</b>	33,5	19,1	0,71	
<b>40</b>	90	52	28	19	33	10	5,5	M10X1,25	<b>UC308</b>	40,5	24	0,96	
<b>45</b>	100	57	30	22	35	10	6	M10X1,25	<b>UC309</b>	53	32	1,28	
<b>50</b>	110	61	32	22	39	12	6,1	M12X1,25	<b>UC310</b>	62	38,5	1,65	
<b>55</b>	120	66	34	25	41	12	6,4	M12X1,25	<b>UC311</b>	71,5	45	1,90	
<b>60</b>	130	71	36	26	45	12	6,7	M12X1,25	<b>UC312</b>	82	52	2,60	
<b>65</b>	140	75	38	30	45	12	6,9	M12X1,25	<b>UC313</b>	92,5	60	3,25	
<b>70</b>	150	78	40	33	47	12	7,2	M12X1,25	<b>UC314</b>	104	68	3,95	
<b>75</b>	160	82	42	32	50	14	7,5	M14X1,5	<b>UC315</b>	113	77	4,33	
<b>80</b>	170	86	44	34	52	14	7,5	M14X1,5	<b>UC316</b>	122	86	5,57	

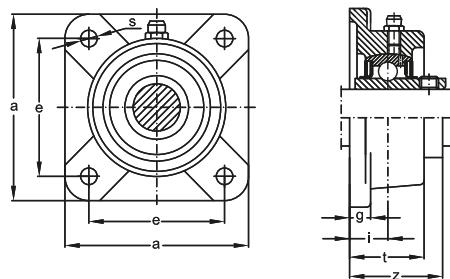
**SSUCP series pillow blocks**  
**Normal duty with set screw lock and grease fitting**



Dimensions												Unit no.	Bolt size	Bearing no.	Housing no.
d	B	n	b	h	g	w	a	e	s <sub>1</sub>	s <sub>2</sub>	-	mm			
mm															
<b>12</b>	27,4	11,5	38	30,2	14	62	127	95	12	19	<b>SSUCP201</b>	M10	<b>SSUC201</b>	<b>SSP203</b>	
<b>15</b>	27,4	11,5	38	30,2	14	62	127	95	12	19	<b>SSUCP202</b>	M10	<b>SSUC202</b>	<b>SSP203</b>	
<b>17</b>	27,4	11,5	38	30,2	14	62	127	95	12	19	<b>SSUCP203</b>	M10	<b>SSUC203</b>	<b>SSP203</b>	
<b>20</b>	31	12,7	38	33,3	15	65	127	95	12	19	<b>SSUCP204</b>	M10	<b>SSUC204</b>	<b>SSP204</b>	
<b>25</b>	34,1	14,3	38	36,5	16	70	140	105	15	19	<b>SSUCP205</b>	M10	<b>SSUC205</b>	<b>SSP205</b>	
<b>30</b>	38,1	15,9	48	42,9	18	83	165	121	15	21	<b>SSUCP206</b>	M12	<b>SSUC206</b>	<b>SSP206</b>	
<b>35</b>	42,9	17,5	48	47,6	19	94	167	127	15	21	<b>SSUCP207</b>	M12	<b>SSUC207</b>	<b>SSP207</b>	
<b>40</b>	49,2	19	54	49,2	19	100	184	137	15	23	<b>SSUCP208</b>	M12	<b>SSUC208</b>	<b>SSP208</b>	
<b>45</b>	49,2	19	54	54	20	108	190	146	15	23	<b>SSUCP209</b>	M12	<b>SSUC209</b>	<b>SSP209</b>	
<b>50</b>	51,6	19	60	57,2	22	114	206	159	19	23	<b>SSUCP210</b>	M16	<b>SSUC210</b>	<b>SSP210</b>	

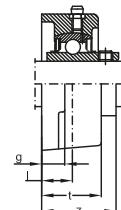
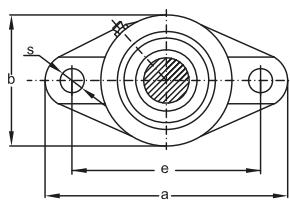
Note: Grease fitting 1/4 - 28 UNF

**SSUCF series four bolt flanges**  
**Normal duty with set screw lock and grease fitting**



Dimensions								Unit no.	Bolt size	Bearing no.	Housing no.
d	z	t	g	i	s	a	e	-	mm		
										mm	
<b>12</b>	30,9	24	11	15	12	76	54	<b>SSUCF201</b>	M10	<b>SSUC201</b>	<b>SSF203</b>
<b>15</b>	30,9	24	11	15	12	76	54	<b>SSUCF202</b>	M10	<b>SSUC202</b>	<b>SSF203</b>
<b>17</b>	20,9	24	11	15	12	76	54	<b>SSUCF203</b>	M10	<b>SSUC203</b>	<b>SSF203</b>
<b>20</b>	33,3	25	11	15	12	86	63,5	<b>SSUCF204</b>	M10	<b>SSUC204</b>	<b>SSF204</b>
<b>25</b>	35,8	26,5	13	16	12	95	70	<b>SSUCF205</b>	M10	<b>SSUC205</b>	<b>SSF205</b>
<b>30</b>	40,2	30	13	18	15	108	82,5	<b>SSUCF206</b>	M12	<b>SSUC206</b>	<b>SSF206</b>
<b>35</b>	44,4	33	14	19	15	117	92	<b>SSUCF207</b>	M12	<b>SSUC207</b>	<b>SSF207</b>
<b>40</b>	51,2	36	14	21	15	130	101,5	<b>SSUCF208</b>	M12	<b>SSUC208</b>	<b>SSF208</b>
<b>45</b>	52,2	38	14	22	15	137	105	<b>SSUCF209</b>	M12	<b>SSUC209</b>	<b>SSF209</b>
<b>50</b>	54,6	39	15	22	19	143	111	<b>SSUCF210</b>	M16	<b>SSUC210</b>	<b>SSF210</b>

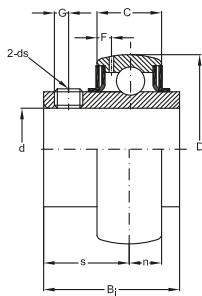
**SSUCFL series two bolt flanges**  
**Normal duty with set screw lock and grease fitting**



Dimensions									Unit no.	Bolt size	Bearing no.	Housing no.	
d	z	t	g	i	b	s	a	e	-	mm			
<b>mm</b>											<b>mm</b>		
<b>12</b>	30,9	24	11	15	55	12	98,5	76,5	<b>SSUCFL201</b>	M10	<b>SSUC201</b>	<b>SSFL203</b>	
<b>15</b>	30,9	24	11	15	55	12	98,5	76,5	<b>SSUCFL202</b>	M10	<b>SSUC202</b>	<b>SSFL203</b>	
<b>17</b>	30,9	24	11	15	55	12	98,5	76,5	<b>SSUCFL203</b>	M10	<b>SSUC203</b>	<b>SSFL203</b>	
<b>20</b>	33,3	25	11	15	60	12	112	90	<b>SSUCFL204</b>	M10	<b>SSUC204</b>	<b>SSFL204</b>	
<b>25</b>	35,8	26,5	13	16	68	12	124	99	<b>SSUCFL205</b>	M10	<b>SSUC205</b>	<b>SSFL205</b>	
<b>30</b>	40,2	30	13	18	80	15	141	116,5	<b>SSUCFL206</b>	M12	<b>SSUC206</b>	<b>SSFL206</b>	
<b>35</b>	44,4	33	14	19	90	15	155,5	130	<b>SSUCFL207</b>	M12	<b>SSUC207</b>	<b>SSFL207</b>	
<b>40</b>	51,2	36	14	21	100	15	171,5	143,5	<b>SSUCFL208</b>	M12	<b>SSUC208</b>	<b>SSFL208</b>	
<b>45</b>	52,2	38	14	22	108	15	179	148,5	<b>SSUCFL209</b>	M12	<b>SSUC209</b>	<b>SSFL209</b>	
<b>50</b>	54,6	39	15	22	115	19	189	157	<b>SSUCFL210</b>	M16	<b>SSUC210</b>	<b>SSFL210</b>	

Note: Grease fitting 1/4 - 28 UNF

## SSUC series bearing insert Normal duty with set screw lock



Dimensions							Basic load ratings		Designation	
d H7	D H5	B	S	r <sub>min</sub>	C	d <sub>s</sub>	G	C <sub>r</sub> *	C <sub>0r</sub>	
mm							N			
<b>12</b>	40	27,4	11,5	0,6	14	M5 x 0,5	4	7350	4750	<b>SSUC201</b>
<b>15</b>	40	27,4	11,5	0,6	14	M5 x 0,5	4	7350	4750	<b>SSUC202</b>
<b>17</b>	40	27,4	11,5	0,6	14	M5 x 0,5	4	7350	4750	<b>SSUC203</b>
<b>20</b>	47	31	12,7	1	17	M6 x 0,75	5	9800	6550	<b>SSUC204</b>
<b>25</b>	52	34,1	14,3	1	17	M6 x 0,75	5	10800	7800	<b>SSUC205</b>
<b>30</b>	62	38,1	15,9	1	19	M6 x 0,75	5	15000	11200	<b>SSUC206</b>
<b>35</b>	72	42,9	17,5	1,1	20	M8 x 1	7	19600	15300	<b>SSUC207</b>
<b>40</b>	80	49,2	19	1,1	21	M8 x 1	8	23600	19000	<b>SSUC208</b>
<b>45</b>	85	49,2	19	1,1	22	M8 x 1	8	25500	21600	<b>SSUC209</b>
<b>50</b>	90	51,6	19	1,1	24	M10 x 1	10	27000	23200	<b>SSUC210</b>

Note: \*Multiply the load "Cr" by 1,3 if the tolerance of mounted shaft is "h6" or higher.

**URB GROUP**

URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

710



711

URB

# Cam Rollers

## Standards, Boundary dimensions

Standard plans DIN 616

## General

**Cam Rollers** are non-separable radial bearings. They are special variants of either radial **deep groove bearings** or **double row angular contact ball bearings**.

Cam roller run either directly on a guide track or against a surface that has been machined for a guidance.

To achieve this cam rollers feature an extra thick-walled outer ring this enables cam roller to accept high radial forces, including shock loads.

As cam rollers often run misaligned they are generally used with crowned outer ring surfaces.

Cam rollers normally run outside the machine compartment, under extreme operating conditions, in the presence of heavy contaminations (i.e. dust and dirt, etc).

For this reason, cam rollers are produced and fitted with contacting seals.

Some types of the Double Row cam rollers are also available with shields.

## Design variants

(see also drawings on following pages)

Cam rollers are readily available in several design variants. For the most common designs see drawings on page 713.

## Single Row Cam Rollers

**Cam rollers** of the narrow series (series **3612..** and **3612.. R**, are based on the proven sealed single row deep groove ball bearings, (suffix **.2RS**) for their internal design.

The **URB cam rollers**, series **3612..** and **3612..R**, respectively, are produced with **.2RS**.

- type contacting seals as standard. These seals provide a very effective and efficient sealing of the bearing compartment against penetration by foreign particles even under unfavourable operating conditions.

The narrow **URB cam rollers**, series **3612** are available with either cylindrical (without extra suffix) or crowned outer ring diameter (suffix **R**) as standard.

The radius of crowning on single row cam rollers for the series **3612.. R**, is standardised at **R = 400 mm, irrespective of their outer diameter**.

## Double Row Cam Rollers

The internal design of **URB double row cam rollers** (series **305** and **306**) are based on the double row angular contact ball bearings of the series **32..** (for series **305**) or **33..** (for series **306** cam rollers), respectively.

**URB double row cam rollers** have contact angles of  $25^\circ$  they also feature polyamide cages as standard.

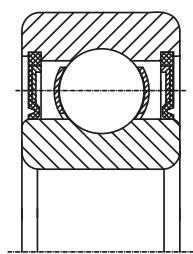
Double row cam rollers are widely used with pressed steel shields, (suffix **.2Z**), they are also available with **rubbing seals** (suffix **.2RS**) as standard.

As for single row rollers, **URB double row cam rollers** are produced with either a, cylindrical or sphered outer ring diameters.

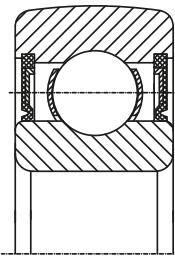
The radius of crowning of double row cam roller outer diameter is also **standardised at R = 400 mm**.

## Material of seals

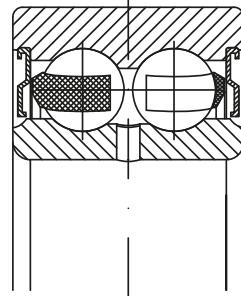
For the contacting seal of sealed **URB - cam**



3612...

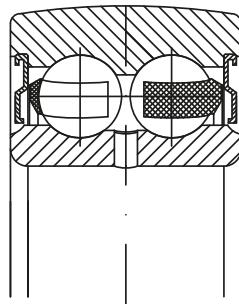


3612...R

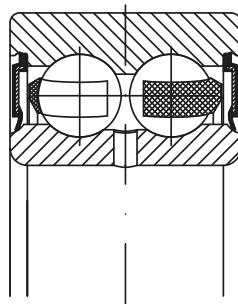


3057...2Z

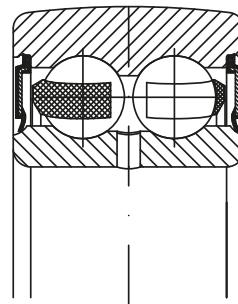
3067...2Z



3058...2Z  
3068...2Z



3057...2RS  
3067...2RS



3058...2RS  
3068...2RS

**rollers** (suffix **.2RS**) a wear - resistant **synthetic rubber (NBR)** is used as standard material.

This seal material is suitable for operating temperatures of **-30°C** up to **+120°C**.

On request, the **URB** - cam rollers are supplied with alternative seal materials, such as high - temperature **FPM** - contacting seals.

#### Grease filling

URB cam rollers incorporating either seals or shields (suffixes) are supplied grease filled from the factory with a proven high quality, lithium soap based rolling bearing grease suitable for operating temperatures of **-30°C** up to **+110°C**.

Although cam rollers, operating under normal

conditions, run generally maintenance free.

Some application require additional lubrication where high speeds, heavy dust, permanent operating temperatures over 70°C exist.

**Double Row cam rollers** only feature a lubrication hole in the inner rings to provide a simple and effective relubricating method.

Where relubrication is necessary, it is emphasised that, undue pressure by the regreasing method may cause unnecessary damage to either the seals or shields.

**URB cam rollers** are supplied with special grease fillets according to customer specification or with variable grease fill volumes than the standard.

## Cages

**Single Row Cam Rollers** are standard fitted with pressed steel cages as standard. **Double Row Cam Rollers** feature solid polyamide cages as standard.

## Tolerances

**URB cam rollers**, with cylindrical outer ring diameter, are produced to normal class tolerances (**PN**) as standard.

For cam rollers with spheroid outer ring diameters the outer ring diameter tolerance is double the standard value.

For detailed tolerance values see in the chapter "Bearing tolerances" page 28.

## Internal clearance

**URB cam rollers** are produced with **normal internal clearance group (CN) as standard** according to DIN 620.

**URB cam rollers** are also produced to other internal clearances.

## Load carrying capability

Unlike the "normal" rolling element bearings, the outer ring of cam rollers contact their adjacent mating surface on a very small contacting area, this causes deformations of the outer ring.

These deformations are considered by the recommended maximum values for the permissible dynamic and static radial loads as shown in the product tables.

## Equivalent dynamic load

Cam rollers must be calculated as rolling element bearings:

$$P = F_r$$

But,  $P$  must be  $\leq F_r \text{ max}$   
(for  $F_r \text{ max}$  see product tables)

## Equivalent static bearing load

For Cam rollers:

$$P_0 = F_r$$

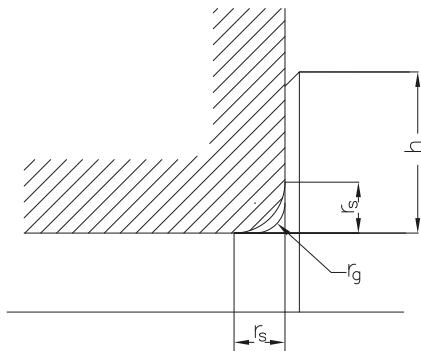
But,  $P_0$  must be  $\leq F_{or} \text{ max}$   
(for  $F_{or} \text{ max}$  see product tables)

## Abutment and Fillet dimensions for cam rollers

The bearing inner ring must contact adjacent surfaces with their side faces only. The radius of inner ring corners must not touch the fillet radius of the shaft shoulder.

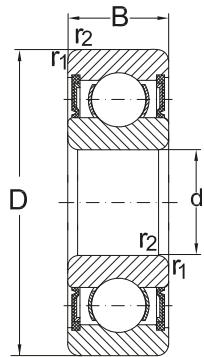
Therefore, the largest fillet radius ( $r_g$ ) must be smaller than the minimum fillet dimension of the cam roller inner rings ( $r_s$ ) as listed in the product tables.

Since cam rollers normally have point loaded inner rings, their shaft fits may be rather loose, (i.e. according to ISO - tolerance fields g6, h6 or j6).

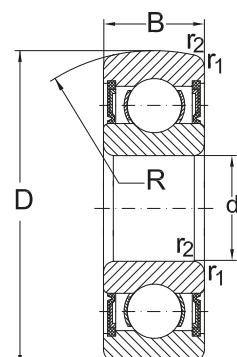


$r_{smin}$	$r_{gmax}$	$h_{min}$
0.6	0.6	2.1
1	1	2.8
1.1	1	3.5
1.5	1.5	4.5
2	2	5.5

## Cam Rollers, Single Row



3612...



3612...R

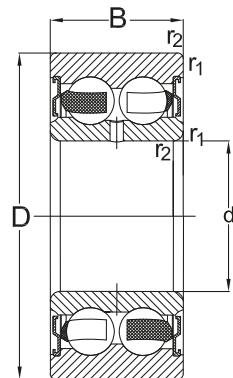
Dimensions						Designation	
D	d	B	R	r <sub>1</sub> , r <sub>2</sub> min.	With cylindrical outer ring	With spherized outer ring	
mm							
32	10	9	400	0,6	<b>361200</b>	<b>361200 R</b>	
35	12	10	400	0,6	<b>361201</b>	<b>361201 R</b>	
40	15	11	400	0,6	<b>361202</b>	<b>361202 R</b>	
47	17	12	400	0,6	<b>361203</b>	<b>361203 R</b>	
52	20	14	400	1	<b>361204</b>	<b>361204 R</b>	
62	25	15	400	1	<b>361205</b>	<b>361205 R</b>	
72	30	16	400	1	<b>361206</b>	<b>361206 R</b>	
80	35	17	400	1,1	<b>361207</b>	<b>361207 R</b>	
85	40	18	400	1,1	<b>361208</b>	<b>361208 R</b>	
90	45	19	400	1,1	<b>361209</b>	<b>361209 R</b>	

## Cam Rollers, Single Row

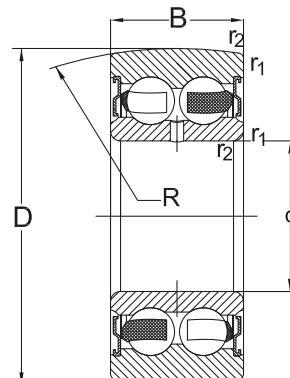
*Abutment and  
fillet dimensions  
see on page 714*

Speed rating  min <sup>-1</sup>	Load ratings				Max. permissible radial load		Mass  kg
	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	dyn. C <sub>LR</sub>	stat. C <sub>OLR</sub>	dyn. F <sub>r max</sub>	stat. F <sub>0r max</sub>	
17000	5,1	2,4	4,6	2	3,4	4,9	0,041
15000	6,8	3,1	6,2	2,6	3,3	4,7	0,052
13000	7,8	3,8	7,1	3,2	5	7,2	0,074
12000	9,6	4,8	8,8	4,2	8,2	11,6	0,11
10000	12,7	6,6	11,4	5,4	7,4	10,6	0,16
8500	14	7,8	12,7	6,8	12,9	18	0,24
7500	19,5	11,2	17,4	9,3	14,3	20,4	0,34
6300	25,5	15,3	22,1	11,8	12,7	18	0,43
5000	32,5	19,8	22,8	13,6	13,4	23,1	0,45
4500	32,5	20,4	22,5	13,7	13,3	22,8	0,50

## Cam Rollers, Double Row



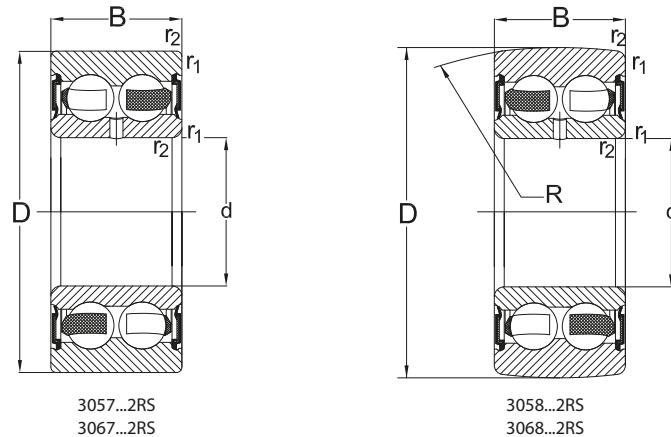
3057...2Z  
3067...2Z



3058...2Z  
3068...2Z

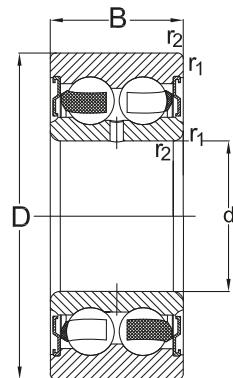
Dimensions						Designation	
D	d	B	R	$r_1, r_2$ min.	With cylindrical outer ring	With spherized outer ring	
mm							
<b>32</b>	10	14	400	0,6	<b>305700 2Z</b>	<b>305800 2Z</b>	
	10	14	400	0,6	<b>305700 2RS</b>	<b>305800 2RS</b>	
<b>35</b>	12	15,9	400	0,6	<b>305701 2Z</b>	<b>305801 2Z</b>	
	12	15,9	400	0,6	<b>305701 2RS</b>	<b>305801 2RS</b>	
<b>40</b>	15	15,9	400	0,6	<b>305702 2Z</b>	<b>305802 2Z</b>	
	15	15,9	400	0,6	<b>305702 2RS</b>	<b>305802 2RS</b>	
<b>47</b>	17	17,5	400	0,6	<b>305703 2Z</b>	<b>305803 2Z</b>	
	17	17,5	400	0,6	<b>305703 2RS</b>	<b>305803 2RS</b>	
	15	19	400	1,0	<b>306702 2Z</b>	<b>306802 2Z</b>	
	15	19	400	1,0	<b>306702 2RS</b>	<b>306802 2RS</b>	
<b>52</b>	20	20,6	400	1	<b>305704 2Z</b>	<b>305804 2Z</b>	
	20	20,6	400	1	<b>305704 2RS</b>	<b>305804 2RS</b>	
	17	22,2	400	1,0	<b>306703 2Z</b>	<b>306803 2Z</b>	
	17	22,2	400	1,0	<b>306703 2RS</b>	<b>306803 2RS</b>	
<b>62</b>	25	20,6	400	1	<b>305705 2Z</b>	<b>305805 2Z</b>	
	25	20,6	400	1	<b>305705 2RS</b>	<b>305805 2RS</b>	

## Cam Rollers, Double Row

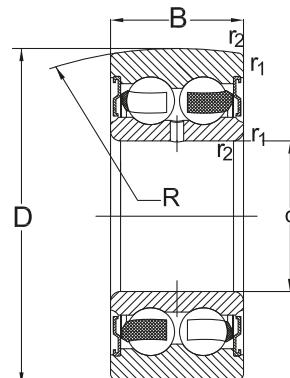


Speed rating $\text{min}^{-1}$	Load ratings as bearing		Load ratings as cam roller		Max. permissible radial load		Mass kg
	dyn. $C_r$	stat. $C_{0r}$	dyn. $C_{LR}$	stat. $C_{0LR}$	dyn. $F_{r\max}$	stat. $F_{0r\max}$	
13000	7,8	4,5	7,4	4,1	9	12,9	0,062
8500	7,8	4,5	7,4	4,1	9	12,9	0,062
11000	10,6	5,9	10	5,2	8,3	12	0,078
7300	10,6	5,9	10	5,2	8,3	12	0,078
10000	11,9	7,1	11,1	6,4	12,2	17,6	0,10
6500	11,9	7,1	11,1	6,4	12,2	17,6	0,10
9000	14,6	9	13,8	8,3	19,3	27,5	0,16
6000	14,6	9	13,8	8,3	19,3	27,5	0,16
10000	17,7	10,3	14,6	9,2	12,5	18,4	0,15
6500	17,7	10,3	14,6	9,2	12,5	18,4	0,15
8000	19,5	12,5	18,2	11	17	24,5	0,22
5300	19,5	12,5	18,2	11	17	24,5	0,22
9500	21,1	12,5	17,2	11	15,5	22,2	0,20
6300	21,1	12,5	17,2	11	15,5	22,2	0,20
7000	21,2	14,6	19,9	13,4	30,5	44	0,32
4500	21,2	14,6	19,9	13,4	30,5	44	0,32

## Cam Rollers, Double Row



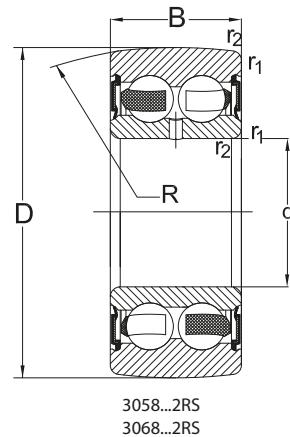
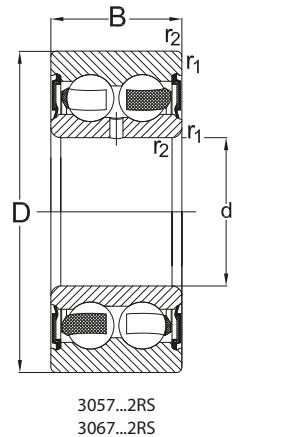
3057...2Z  
3067...2Z



3058...2Z  
3068...2Z

Dimensions						Designation	
D	d	B	R	r <sub>1</sub> , r <sub>2</sub> min.	With cylindrical outer ring	With spherized outer ring	
mm							
<b>62</b>	20	22,2	400	1,1	<b>306704 2Z</b>	<b>306804 2Z</b>	
	20	22,2	400	1,1	<b>306704 2RS</b>	<b>306804 2RS</b>	
<b>72</b>	30	23,8	400	1	<b>305706 2Z</b>	<b>305806 2Z</b>	
	30	23,8	400	1	<b>305706 2RS</b>	<b>305806 2RS</b>	
	25	25,4	400	1,1	<b>306705 2Z</b>	<b>306805 2Z</b>	
	25	25,4	400	1,1	<b>306705 2RS</b>	<b>306805 2RS</b>	
<b>80</b>	35	27	400	1,1	<b>305707 2Z</b>	<b>305807 2Z</b>	
	35	27	400	1,1	<b>305707 2RS</b>	<b>305807 2RS</b>	
	30	30,2	400	1,1	<b>306706 2Z</b>	<b>306806 2Z</b>	
	30	30,2	400	1,1	<b>306706 2RS</b>	<b>306806 2RS</b>	
<b>90</b>	35	34,9	400	1,5	<b>306707 2Z</b>	<b>306807 2Z</b>	
	35	34,9	400	1,5	<b>306707 2RS</b>	<b>306807 2RS</b>	
<b>100</b>	40	36,5	400	1,5	<b>306708 2Z</b>	<b>306808 2Z</b>	
	40	36,5	400	1,5	<b>306708 2RS</b>	<b>306808 2RS</b>	

## Cam Rollers, Double Row



*Abutment and  
fillet dimensions  
see on page 714*

Speed rating  min <sup>-1</sup>	Load ratings				Max. permissible radial load		Mass kg
	dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	dyn. C <sub>LR</sub>	stat. C <sub>0LR</sub>	dyn. F <sub>r max</sub>	stat. F <sub>0r max</sub>	
9000	24,5	15,8	21,1	14,5	27	29	0,34
6000	24,5	15,8	21,1	14,5	27	29	0,34
6000	29,6	21,2	27,6	18,6	34	49	0,49
4000	29,6	21,2	27,6	18,6	34	49	0,49
7900	32,5	21,6	27,5	19,5	34,5	39	0,5
5200	32,5	21,6	27,5	19,5	34,5	39	0,5
5300	39	28,5	35,1	24	31	44	0,65
3500	39	28,5	35,1	24	31	44	0,65
6200	45,5	31,5	36,5	26,5	43,5	53	0,67
4100	45,5	31,5	36,5	26,5	43,5	53	0,67
5100	56	39,5	44,5	33	39,5	66	0,95
3400	56	39,5	44,5	33	39,5	66	0,95
4700	69	49,5	56	42	70	84	1,2
4700	69	49,5	56	42	70	84	1,2



# Support rollers

## Standards, Boundary dimensions

Standard plans DIN 616

## General

**Support Rollers** are either needle roller or cylindrical roller bearings with an extra radially thick outer ring. Depending on their series, support rollers may be both separable and non-separable radial bearings.

**Support Rollers** usually run with their outer ring either directly on a guide track or against a machine surface that is for guidance. Due to their extra-thick outer rings, Support rollers are able to accept high radial forces as well as shock loads.

Their ability to accommodate axial forces, however, depends on the particular design of the support roller.

Support roller are usually exposed to minor misalignments during operation. To minimize the negative effects of such misalignments, (e.g. high edge stresses), support rollers are more frequently used with spherical outer rings.

**URB - support rollers** with parallel (cylindrical) outer diameters are indicated by the suffix "X".

## Design variants

In order to cover as many applications as possible, **URB Support rollers** are available in several different design variants as standard.

To provide simple re-lubrication, all support roller have lubrication holes in their inner rings.

For the most common design are shown in the figures on the pages 725 and 727.

## Support Rollers without axial guidance

The most simple design of support rollers is provided by the **STO** - type rollers.

For these rollers the outer ring, inner ring and the needle roller and cage assembly may be fitted separately. Since **STO** - type support rollers do not provide any axial guidance to their needle roller and cage assembly they adequately accept radial loads only.

The axial guidance of outer ring and needle roller and cage assembly must be provided by a suitable design of adjacent machine parts.

**STO** - Type support rollers are frequently used without their inner rings, namely **RSTO** - rollers. The needle roller and cage assembly of **RSTO** - type support rollers run directly onto the shaft surface, which must be designed in an adequate manner, (e.g. hardened and ground).

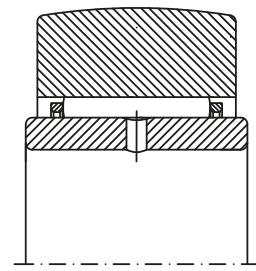
For detailed guide lines on the design of bearing raceways on shafts see chapter "**Bearing application**" on page 46.

**STO** and **RSTO** - type support rollers are the only support rollers that are satisfactory for operating with oil lubrication.

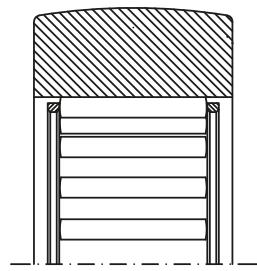
Unlike the **STO** - type support rollers, the outer ring, and the needle rollers and cage assembly of series **NA 22 ..2RS** build a unit, whilst the inner ring may be dealt with individually.

**NA 22 ..2RS** - type support rollers also accommodate radial loads only. They also require adequate axial guidance of their outer rings by adjacent parts.

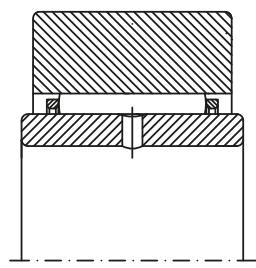
Due to the contact seals, which are integrated in their outer rings, **NA 22 ..2RS** - type support rollers provide the possibility for maintenance-free bearing arrangements.



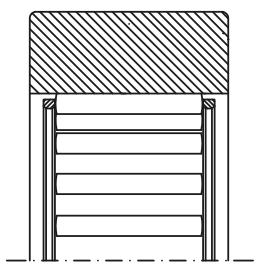
STO



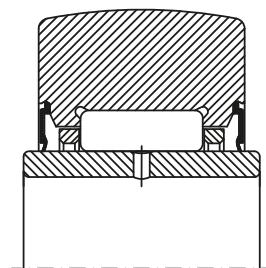
RSTO



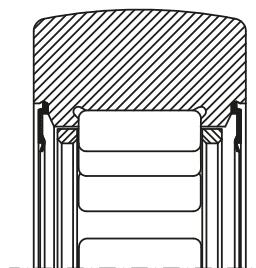
STO...X



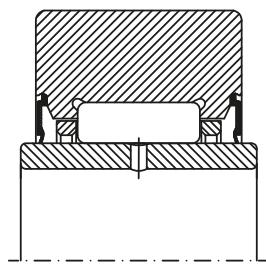
RSTO...X



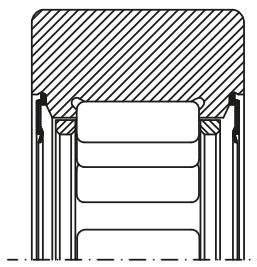
NA22...2RS



RNA22...2RS



NA22...2RS.X



RNA22...2RS.X

Sealed support rollers, without inner rings, are also produced, namely **RNA 22...2RS**.

For these types both the needle rollers and the rubbing seals run on the contacting shaft surface.

### Support Rollers with axial guidance

These types of supporting rollers are also to accommodate additional thrust loads as they occur, due to aligning errors or if rollers run out of line.

That is why no extra external guiding surfaces are required.

Where high axial loads are anticipated effective axial support of side washers must be achieved by the adjacent machine components.

### Support rollers, type STO..2Z

**STO...2Z** - type support rollers are designed similar to the **STO** - type but have two loose side plates to accept axial forces.

These types of support rollers are separable, this enables simple mounting of the rollers due to the separable parts.

Particular attention must be paid to the adequate axial camping of loose side washers during mounting.

The side plates of STO...2Z - type support rollers must not have any axial play when they are mounted.

### Support rollers, type NATR

The side washers of NATR - type needle roller support rollers are pressed into the inner ring to ensure guidance of the outer ring and the needle roller and cage assembly.

Therefore, these roller types are non - separable. NATR - type needle roller support roller are optimum for applications where the rollers are exposed to high radial loads at high speeds.

The sealed support rollers, namely, **NATR..PP**, which feature integrated rubbing seals on each side of the outer ring are very suitable for operating in harsh conditions (e.g. heavy dust, dirt and other contaminates).

### Support rollers, type NATV

**NATV**-type rollers are identical to the **NATR**-type except they have no fitted cage (i.e. full complement type).

This enables an increased numbers of needle roller to be fitted in the available space (i.e. full circumferentially and radially). Therefore, significantly higher "basic" load ratings are achieved.

**NATV** type full complement rollers are unsuitable for high speed applications due to the differing kinematic operating condition. Also they must be re-lubricated more frequently.

For applications of harsh operating conditions the sealed support roller, namely, **NATV...PP** is also available.

### NUTR - type support rollers

The base internal design of **NUTR** - type support rollers is similar to that of double row cylindrical roller bearings.

Since the outer ring has two shoulders these support rollers are able to accommodate greater thrust loads.

**NUTR** - type support rollers are non separable.

The separate loose ribs of these type are retained using either cupped washers pressfitted into the outer ring or with lamellar rings which sit in the formed circumferential grooves machined in the loose rib outer diameter.

Both methods also act as a gap seal.

Due to do their full complement design, **NUTR** - type support roller feature a maximum load rating but they must be more frequently re-lubrication.

For extra heavy duty applications, particularly where heavy shock loads occur **NUTR** - type support rollers are available with an extra - radially thick walled outer ring (see sketch).

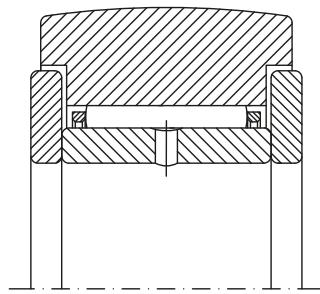
URB's extra heavy duty **NUTR** -type support rollers with increased outer ring wall thickness are identified by the fact that their nominal diameters are included in their designation.

Examples:

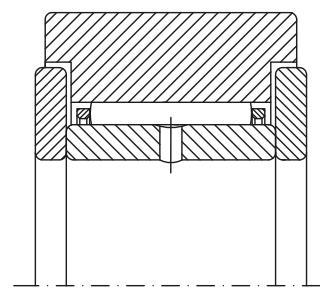
**NUTR 1747**

or

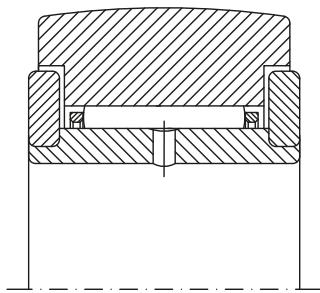
**NUTR 50110.**



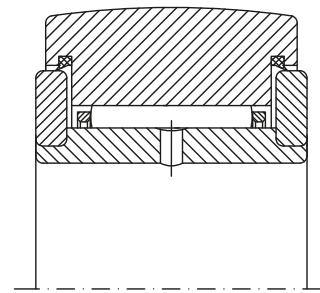
STO...2Z



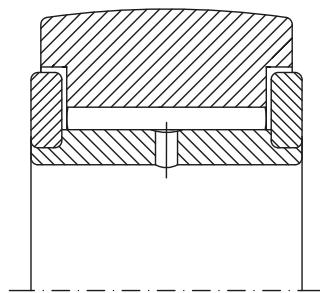
STO...2ZX



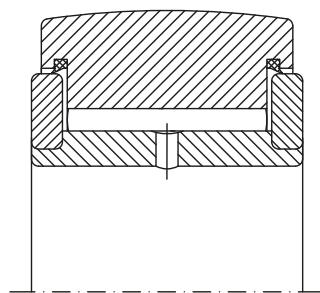
NATR



NATR...PP



NATV



NATV...PP

**Tolerance values of ISO - tolerance fields F6 and h12 [μm]**

Nominal dimension	[mm]	>	3	6	10	18	30	50
		≤	6	10	18	30	50	80
ISO - Tolerance field	F6	min	+10	+13	+16	+20	+25	+30
		max	+18	+22	+27	+33	+41	+49
ISO - Tolerance field	h12	min	-120	-150	-180	-210	-250	-300
		max	0	0	0	0	0	0

All **URB support rollers** are produced with **crowned outer ring diameter as standard** they are also available with parallel (cylindrical) outer diameters indicated by the suffix "X", see the relevant designs.

## Material of seals

Several types of URB support rollers, such as series **NA22...2RS**, **NATR .. PP** und **NATV..PP** are also available in sealed versions.

These support rollers feature contacting seals made from wear - resistant synthetic rubber compound (**NBR**) that provides an efficient and effective seal against the penetration of impurities or the escape of grease.

The synthetic rubber used for these contacting seals is satisfactory for operation temperatures of **-30°C** up to **+120°C**.

## Grease filling

All **URB Support rollers** are already supplied filled with a high quality, lithium - soaped bearing grease as standard.

This lubricant is adequate for operating temperatures of **-30°C** up to ca. **+110°C**. Although support rollers under normal operating conditions usually run maintenance - free, they may require more frequent re - lubrication under certain unfavourable operating conditions such as heavy dust, high speeds, permanent operating temperatures of more than **70°C**, and the presence of increased humidity etc.

Therefore a **URB support rollers** feature a lubrication hole in the inner ring to provide the possibility of re-lubricating the rollers, when necessary.

It must be considered where relubrication is necessary, with a satisfactory grease, the force of pressure to re-grease must be of a level not to cause permanent damage to either the seals or shields.

URB also produce roller with alternative grease fill according to customer's specification upon order request.

## Cages

**URB support rollers**, with cages fitted, have normally pressed steel cages as standard. Only small support rollers without axial guidance, series **STO** and **RSTO**, respectively, are fitted with solid polyamide cages (suffix **TN**), as standard.

## Tolerances

URB support rollers are produced to normal tolerance class (**PN**) as standard, according to DIN - standard DIN 620.

The exceptions being the outer ring outer diameter tolerance of crowned outer rings and the width tolerance of supporting roller of series **STO ...2Z**, **NATR**, **NATV** and **NUTR**.

The tolerance for the outer ring diameter of support rollers with sphered outer ring is uniform at:

**0 / -0,05 mm**

The width tolerance of support rollers of series **STO ...2Z**, **NATR**, **NATV** and **NUTR** is lateral and lies in the ISO - tolerance field **h12**.

The tolerance for the **inside diameter of the needle roller complement**, (**F**), of **RSTO** and **RNA 22...2RS** - type support rollers that are used without inner rings, is lateral in the ISO - tolerance field **F6**.

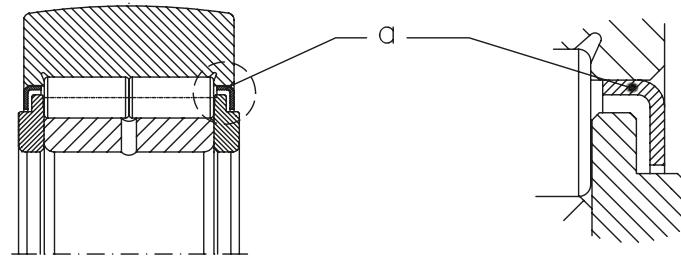
Values of ISO - tolerance field **F6** and **h12** are listed in the table below. For detailed values of tolerances to DIN 620 see chapter "**Bearing tolerances**" page 28.

## Internal Clearance

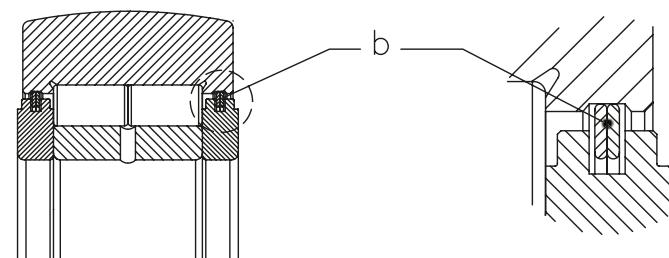
**URB Support rollers** are produced to normal internal clearance group (**CN**) as standard according to DIN 620.

## Load carrying capability

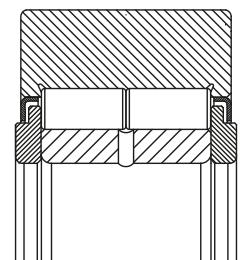
Unlike "normal" rolling element bearings, the outer ring of support rollers contact the adjacent parts with a very small contacting surface only.



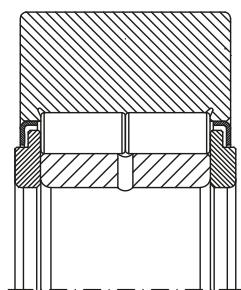
NUTR (a)



NUTR (b)



NUTR...X



NUTR...XXXX

This causes deformations of the outer ring. These are considered by the recommended maximum values for the permissible dynamic and static radial loads as given by the product tables.

### Equivalent dynamic load

Where Support rollers must be calculated as rolling element bearings:

$$P = F_r$$

But,  $P$  must be  $\leq F_r \text{ max}$   
(for  $F_r \text{ max}$  see product tables)

### Equivalent static bearing load

For Support rollers:

$$P_0 = F_r$$

But,  $P_0$  must be  $\leq F_{0r} \text{ max}$   
(for  $F_{0r} \text{ max}$  see product tables)

### Design of adjacent machine components

For support rollers of the series **STO**, **RSTO**, **NA22..2RS** and **RNA22..2RS**, an effective axial guidance of the outer rings must be provided by satisfactory designed surrounding parts.

These guiding surfaces must have a clean and plain machined surface, minimum fine turned, without any burrs.

These guide surfaces which are machined should reach **50%**, or greater, of the outer ring radial wall section or the equivalent diameter.

**Hardened guide surfaces**, however, feature a higher wear - resistance and may therefore be smaller in diameter.

**RSTO** and **RNA22..2RS** - type support rollers that run directly on a shaft require an **axial play** of 0,2 mm minimum between the lateral guiding surfaces in mounted condition.

The diameter of the supposed shaft raceway should have a diameter tolerance according to **k5**.

The shaft or pin have to fulfil certain requirements in terms of hardness, dimensional and geometric accuracy.

For detailed information on the design requirements see the chapter "**Bearing application**" on page 46.

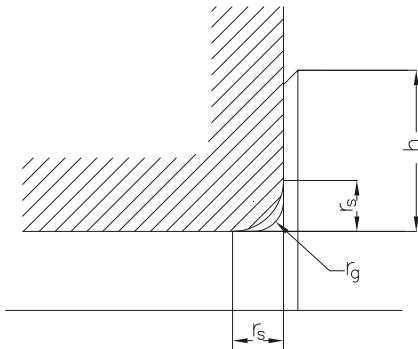
For support roller which are exposed to high axial loads, effective lateral support of their side washers is necessary.

Since Support rollers usually have point loaded inner rings, their shaft may be rather loose (i.e. according to ISO - tolerance fields **g6**, **h6** or **j6**).

### Abutment and Fillet dimensions for Support rollers

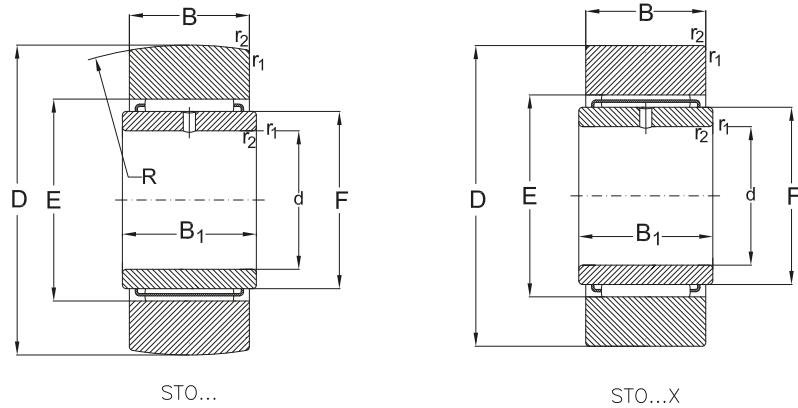
The bearing inner ring must contact adjacent surfaces with their side faces only. The fillet radius of inner ring corners must not touch the fillet radius of shaft shoulder.

Therefore, the largest fillet radius ( $r_g$ ) must be smaller than the minimum fillet dimension of the Support roller inner rings ( $r_s$ ) as listed in the product tables.



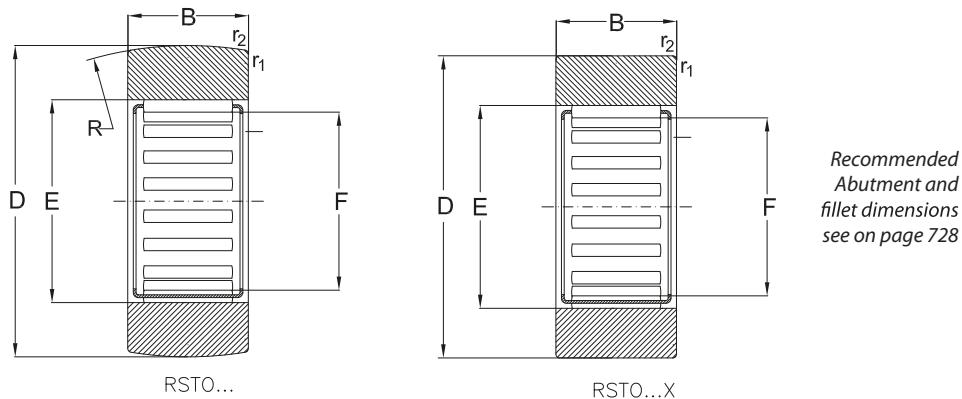
$r_{s\min}$	$r_{g\max}$	$h_{\min}$
0.6	0.6	2.1
1	1	2.8
1.1	1	3.5
1.5	1.5	4.5
2	2	5.5

## Support Rollers without axial guidance



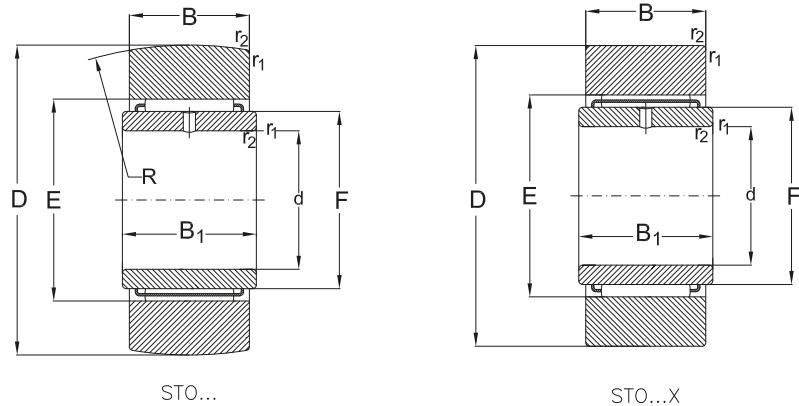
Dimensions						Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	R	with spheroid outer ring	with cylindrical outer ring
mm							
<b>16</b>	-	7,8	-	0,3	500	<b>RSTO5 TN</b>	<b>RSTO5 XTN</b>
<b>19</b>	-	9,8	-	0,3	500	<b>RSTO6</b>	<b>RSTO6 X</b>
	6	9,8	10	0,3	500	<b>STO6</b>	<b>STO6 X</b>
<b>24</b>	-	9,8	-	0,3	500	<b>RSTO8</b>	<b>RSTO8 X</b>
	8	9,8	10	0,3	500	<b>STO8</b>	<b>STO8 X</b>
<b>30</b>	-	11,8	-	0,3	500	<b>RSTO10</b>	<b>RSTO10 X</b>
	10	11,8	12	0,3	500	<b>STO10</b>	<b>STO10 X</b>
<b>32</b>	-	11,8	-	0,3	500	<b>RSTO12</b>	<b>RSTO12 X</b>
	12	11,8	12	0,3	500	<b>STO12</b>	<b>STO12 X</b>
<b>35</b>	-	11,8	-	0,3	500	<b>RSTO15</b>	<b>RSTO15 X</b>
	15	11,8	12	0,3	500	<b>STO15</b>	<b>STO15 X</b>
<b>40</b>	-	15,8	-	0,3	500	<b>RSTO17</b>	<b>RSTO17 X</b>
	17	15,8	16	0,3	500	<b>STO17</b>	<b>STO17</b>
<b>47</b>	-	15,8	-	0,3	500	<b>RSTO20</b>	<b>RSTO20 X</b>
	20	15,8	16	0,3	500	<b>STO20</b>	<b>STO20 X</b>

## Support Rollers without axial guidance



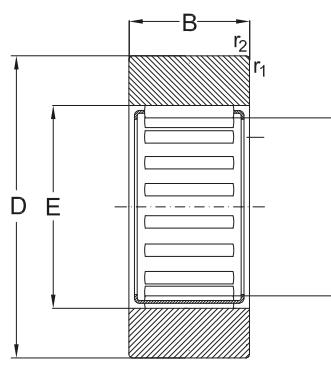
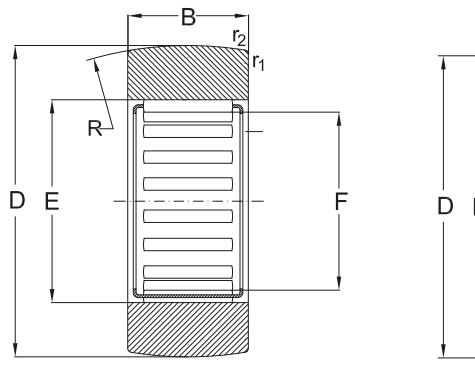
Dimensions F	E	Speed rating $\text{min}^{-1}$	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Mass kg
			dyn. $C_r$	stat. $C_{0r}$	dyn. $C_{LR}$	stat. $C_{OLR}$	dyn. $F_{r\max}$	stat. $F_{0r\max}$	
7	10	24000	2,65	2,5	2,36	2,5	2,9	3	0,01
10	13	18000	5,2	6,55	4	4,5	3,9	5,6	0,01
10	13	18000	5,2	6,55	4	4,5	3,9	5,6	0,02
12	15	16000	5,6	7,65	4,5	5,4	6,4	7,5	0,02
12	15	16000	5,6	7,65	4,5	5,4	6,4	7,5	0,03
14	20	12000	10	10,8	8,15	8,8	7,35	10,6	0,04
14	20	12000	10	10,8	8,15	8,8	7,35	10,6	0,05
16	22	10000	10,6	12	8,3	9,8	7,35	10,8	0,05
16	22	10000	10,6	12	8,3	9,8	7,35	10,8	0,06
20	26	7000	12,5	15,6	8,65	10,6	6,55	11	0,05
20	26	7000	12,5	15,6	8,65	10,6	6,55	11	0,06
22	29	6300	18,3	23,6	13,2	17,6	10,8	18	0,09
22	29	6300	18,3	23,6	13,2	17,6	10,8	18	0,11
25	32	5300	19	26	14,3	15,6	15,6	22,4	0,13
25	32	5300	19	26	14,3	15,6	15,6	22,4	0,15

## Support Rollers without axial guidance



Dimensions						Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	R	with spheroid outer ring	with cylindrical outer ring
mm							
<b>52</b>	-	15,8	-	0,3	500	<b>RSTO25</b>	<b>RSTO25 X</b>
	25	15,8	16	0,3	500	<b>STO25</b>	<b>STO25 X</b>
<b>62</b>	-	19,8	-	0,6	500	<b>RSTO30</b>	<b>RSTO30 X</b>
	30	19,8	20	0,6	500	<b>STO30</b>	<b>STO30 X</b>
<b>72</b>	-	19,8	-	0,6	500	<b>RSTO35</b>	<b>RSTO35 X</b>
	35	19,8	20	0,6	500	<b>STO35</b>	<b>STO35 X</b>
<b>80</b>	-	19,8	-	1	500	<b>RSTO40</b>	<b>RSTO40 X</b>
	40	19,8	20	1	500	<b>STO40</b>	<b>STO40 X</b>
<b>85</b>	-	19,8	-	1	500	<b>RSTO45</b>	<b>RSTO45 X</b>
	45	19,8	20	1	500	<b>STO45</b>	<b>STO45 X</b>
<b>90</b>	-	19,8	-	1	500	<b>RSTO50</b>	<b>RSTO50 X</b>
	50	19,8	20	1	500	<b>STO50</b>	<b>STO50 X</b>

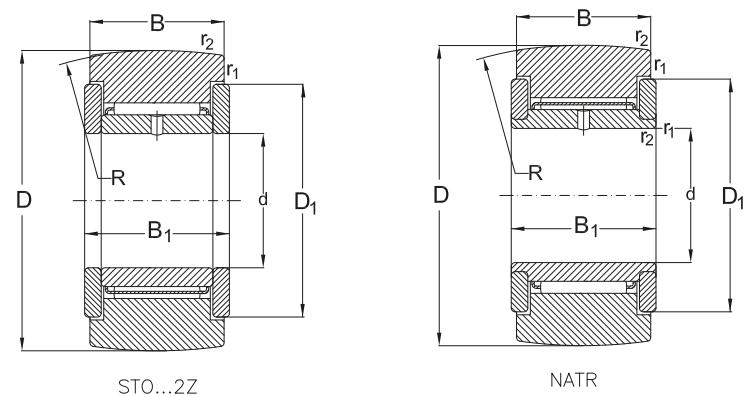
## Support Rollers without axial guidance



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

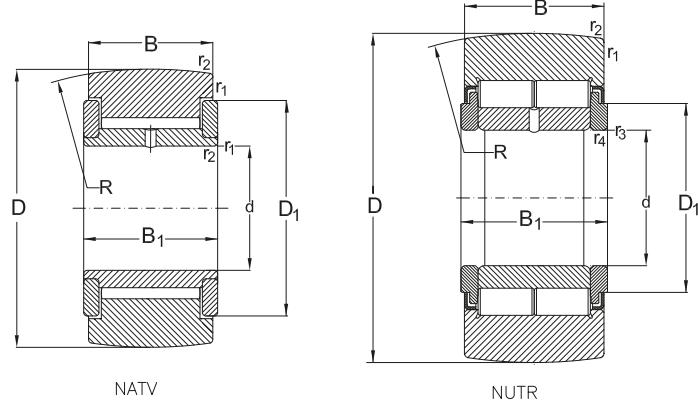
Dimensions F	E	Speed rating $\text{min}^{-1}$	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Mass kg
			dyn. $C_r$	stat. $C_{0r}$	dyn. $C_{LR}$	stat. $C_{OLR}$	dyn. $F_{r\max}$	stat. $F_{0r\max}$	
30	37	4300	21,2	31,5	15	22,8	16	23,6	0,15
30	37	4300	21,2	31,5	15	22,8	16	23,6	0,18
38	46	3000	31,5	52	21,2	34,5	22	33,5	0,26
38	46	3000	31,5	52	21,2	34,5	22	33,5	0,31
42	50	2400	33,5	57	24	40,5	31,5	43	0,38
42	50	2400	33,5	57	24	40,5	31,5	43	0,44
50	58	1800	36,5	68	23,8	39,0	32,5	45	0,42
50	58	1800	36,5	68	23,8	39,0	32,5	45	0,53
55	63	1600	38	75	24,5	43,0	33,5	45,5	0,45
55	63	1600	38	75	24,5	43,0	33,5	45,5	0,58
60	68	1500	40	80	25	45,5	34,5	45,5	0,48
60	68	1500	40	80	25	45,5	34,5	45,5	0,62

## **Support Rollers with axial guidance**



Dimensions							Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	R	with spherded outer ring	with cylindrical outer ring
mm								
<b>16</b>	5	11	12	0,1	-	500	<b>NATR5</b>	<b>NATR5 X</b>
	5	11	12	0,1	-	500	<b>NATV5</b>	<b>NATV5 X</b>
<b>19</b>	6	11	12	0,1	-	500	<b>NATR6</b>	<b>NATR6 X</b>
	6	11	12	0,1	-	500	<b>NATV6</b>	<b>NATV6 X</b>
	6	13,8	14	0,3	-	500	<b>STO6 2Z</b>	<b>STO6 2ZX</b>
<b>24</b>	8	14	15	0,3	-	500	<b>NATR8</b>	<b>NATR8 X</b>
	8	14	15	0,3	-	500	<b>NATV8</b>	<b>NATV8 X</b>
	8	13,8	14	0,3	-	500	<b>STO8 2Z</b>	<b>STO8 2ZX</b>
<b>30</b>	10	14	15	0,6	-	500	<b>NATR10</b>	<b>NATR10 X</b>
	10	14	15	0,6	-	500	<b>NATV10</b>	<b>NATV10 X</b>
	10	15,8	16	0,3	-	500	<b>STO10 2Z</b>	<b>STO10 2ZX</b>
<b>32</b>	12	14	15	0,6	-	500	<b>NATR12</b>	<b>NATR12 X</b>
	12	14	15	0,6	-	500	<b>NATV12</b>	<b>NATV12 X</b>
	12	15,8	16	0,3	-	500	<b>STO12 2Z</b>	<b>STO12 2ZX</b>
<b>35</b>	15	18	19	0,6	-	500	<b>NATR15</b>	<b>NATR15 X</b>
	15	18	19	0,6	-	500	<b>NATV15</b>	<b>NATV15 X</b>

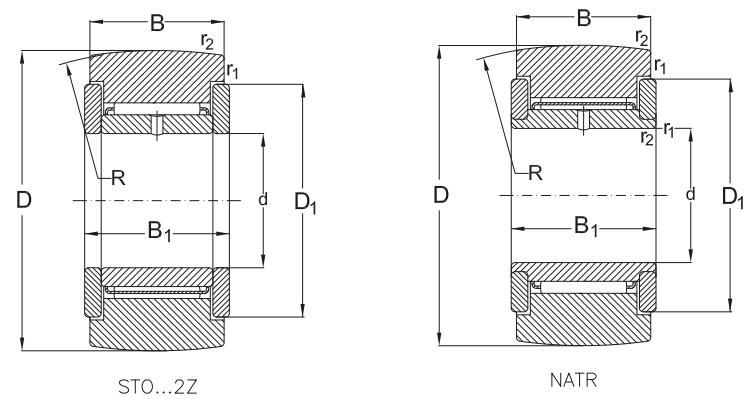
## Support Rollers with axial guidance



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

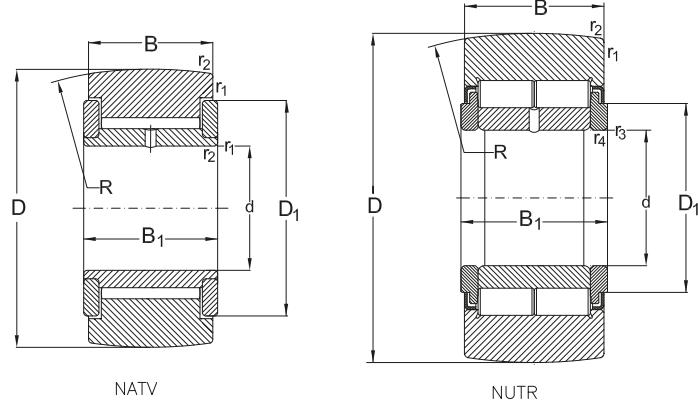
Dimensions	Speed rating	Load ratings				max. permissible radial load		Mass kg			
		as bearing		as support roller		dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	dyn. C <sub>LR</sub>	stat. C <sub>0LR</sub>	dyn. F <sub>r max</sub>	stat. F <sub>0r max</sub>
D	D <sub>1</sub>	min <sup>-1</sup>				kN	kN				
<b>16</b>	12	22000	3,7	3,9	3,1	3,2	2,9	4,1	0,02		
	12	11000	6	8,8	4,7	6,5	4	5,7	0,02		
<b>19</b>	14	20000	4,15	4,75	3,25	3,8	3,45	5,5	0,02		
	14	10000	6,9	11	5,3	8	5,1	7,4	0,02		
	15	18000	5,1	6,55	4	5,1	4,2	5,85	0,03		
<b>24</b>	19	17000	6,6	7,8	5,3	6,1	4,8	7,35	0,04		
	19	8500	9,7	16	7,4	11,4	7,4	10,4	0,04		
	18	16000	5,6	7,65	4,65	6,4	7,1	7,5	0,04		
<b>30</b>	23	15000	7,8	9,65	6,4	8	7,1	11,2	0,06		
	23	7500	11,4	19,3	8,9	14,6	11	15,6	0,07		
	23	12000	10	10,8	8,3	8,8	8,15	11	0,07		
<b>32</b>	25	14000	8,4	10,8	6,6	8,5	7,1	10	0,07		
	25	7000	12,3	22	9,3	15,3	10,6	15	0,07		
	25	10000	10,6	12	8,3	9,3	8	11,2	0,08		
<b>35</b>	27	13000	12,3	19,3	9,5	13,7	11,4	16,3	0,10		
	27	6700	17,2	35,5	12,3	23,2	14,6	20,8	0,11		

## **Support Rollers with axial guidance**



Dimensions							Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	R	with spherded outer ring	with cylindrical outer ring
<b>mm</b>								
<b>35</b>	15	18	19	0,6	0,3	500	<b>NUTR15</b>	<b>NUTR15 X</b>
	15	15,8	16	0,3	-	500	<b>STO15 2Z</b>	<b>STO15 2ZX</b>
<b>40</b>	17	20	21	1	-	500	<b>NATR17</b>	<b>NATR17 X</b>
	17	20	21	1	-	500	<b>NATV17</b>	<b>NATV17 X</b>
	17	20	21	1	0,3	500	<b>NUTR17</b>	<b>NUTR17 X</b>
	17	19,8	20	0,3	-	500	<b>STO17 2Z</b>	<b>STO17 2ZX</b>
<b>42</b>	15	18	19	0,6	0,3	500	<b>NUTR1542</b>	<b>NUTR1542 X</b>
<b>47</b>	20	24	25	1	-	500	<b>NATR20</b>	<b>NATR20 X</b>
	20	24	25	1	-	500	<b>NATV20</b>	<b>NATV20 X</b>
	17	20	21	1	0,3	500	<b>NUTR1747</b>	<b>NUTR1747 X</b>
	20	24	25	1	0,3	500	<b>NUTR20</b>	<b>NUTR20 X</b>
	20	19,8	20	0,3	-	500	<b>STO20 2Z</b>	<b>STO20 2ZX</b>
<b>52</b>	25	24	25	1	-	500	<b>NATR25</b>	<b>NATR25 X</b>
	25	24	25	1	-	500	<b>NATV25</b>	<b>NATV25 X</b>
	20	24	25	1	0,3	500	<b>NUTR2052</b>	<b>NUTR2052 X</b>
	25	24	25	1	0,3	500	<b>NUTR25</b>	<b>NUTR25 X</b>

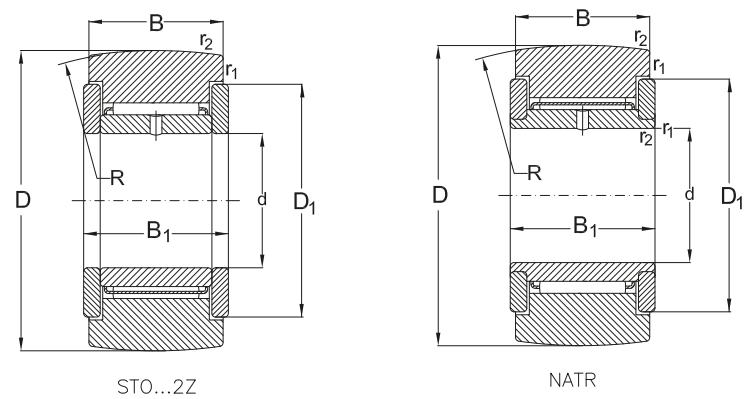
## Support Rollers with axial guidance



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

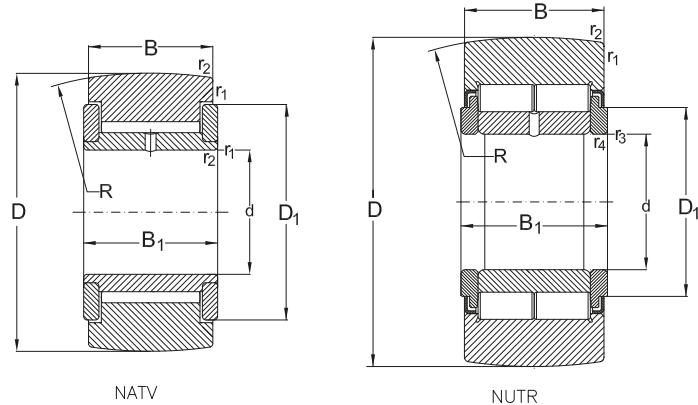
Dimensions	Speed rating	Load ratings				max. permissible radial load		Mass kg			
		as bearing		as support roller		dyn. $C_r$	stat. $C_{0r}$	dyn. $C_{LR}$	stat. $C_{0LR}$	dyn. $F_{r\max}$	stat. $F_{0r\max}$
D	D <sub>1</sub>	min <sup>-1</sup>		kN		kN					
<b>35</b>	20	5600	24,2	28,5	16,8	17,6	8,7	12,2	0,10		
	30	7000	12,3	15,6	8,8	10,6	7,8	6,95	0,09		
<b>40</b>	32	10000	13,4	20,4	10,5	14,6	12,5	18	0,14		
	32	5600	19,4	40	14,2	26,5	17	24,5	0,15		
	22	5300	26	32	19	20	14	22,2	0,15		
	33	6300	18,3	23,6	13,2	16,6	11,4	18,6	0,15		
<b>42</b>	20	5600	24,2	28,5	20,1	17,6	21,6	31	0,16		
<b>47</b>	37	9500	18,7	32,5	14,7	24,5	23,6	33,5	0,25		
	37	5300	26	60	19,4	41,5	30,5	43	0,26		
	22	5300	26	32	22	27	30	43	0,22		
	27	4500	39	49	28,6	33,5	17	25	0,25		
	37	5300	19	26	14,6	19,6	16,6	22,8	0,2		
<b>52</b>	42	8000	20,5	38	14,7	25,5	21,6	31	0,28		
	42	4300	28,6	72	19,8	44	28,5	40,5	0,29		
	27	4500	39	49	30	39	30	42,5	0,32		
	31	3800	44,6	61	29,7	36	18	25,5	0,28		

## **Support Rollers with axial guidance**



Dimensions							Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3'</sub> , r <sub>4</sub> min.	R	with spherded outer ring	with cylindrical outer ring
<b>mm</b>								
<b>52</b>	25	19,8	20	0,3	-	500	<b>STO25 2Z</b>	<b>STO25 2ZX</b>
<b>62</b>	30	28	29	1	-	500	<b>NATR30</b>	<b>NATR30 X</b>
	30	28	29	1	-	500	<b>NATV30</b>	<b>NATV30 X</b>
	25	24	25	1	0,3	500	<b>NUTR 2562</b>	<b>NUTR2562 X</b>
	30	28	29	1	0,3	500	<b>NUTR 30</b>	<b>NUTR30 X</b>
	30	24,8	25	0,6	-	500	<b>STO30 2Z</b>	<b>STO30 2ZX</b>
<b>72</b>	35	28	29	1,1	-	500	<b>NATR35</b>	<b>NATR35 X</b>
	35	28	29	1,1	-	500	<b>NATV35</b>	<b>NATV35 X</b>
	30	28	29	1	0,3	500	<b>NUTR3072</b>	<b>NUTR3072 X</b>
	35	28	29	1,1	0,3	500	<b>NUTR35</b>	<b>NUTR35 X</b>
	35	24,8	25	0,6	-	500	<b>STO35 2Z</b>	<b>STO35 2ZX</b>
<b>80</b>	40	30	32	1,1	-	500	<b>NATR40</b>	<b>NATR40 X</b>
	40	30	32	1,1	-	500	<b>NATV40</b>	<b>NATV40 X</b>
	35	28	29	1,1	0,6	500	<b>NUTR3580</b>	<b>NUTR3580 X</b>
	40	30	32	1,1	0,6	500	<b>NUTR40</b>	<b>NUTR40 X</b>
	40	25,8	26	0,6	-	500	<b>STO40 2Z</b>	<b>STO40 2ZX</b>

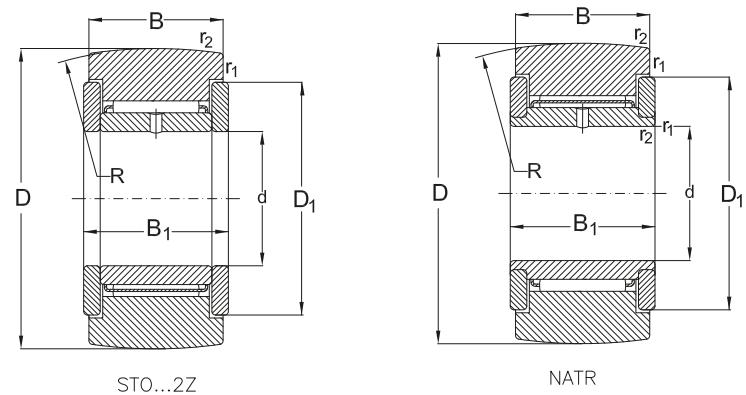
## **Support Rollers with axial guidance**



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

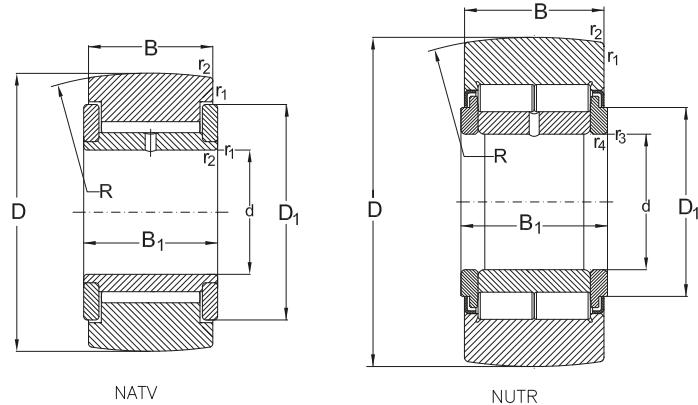
Dimensions		Speed rating	Load ratings				max. permissible radial load		Mass
D	D <sub>1</sub>		as bearing		as support roller		dyn.	stat.	
		C <sub>r</sub>	C <sub>0r</sub>	C <sub>LR</sub>	C <sub>0LR</sub>	F <sub>r max</sub>	F <sub>0r max</sub>		
mm	min <sup>-1</sup>	kN				kN		kg	
<b>52</b>	42	4300	21,2	31,5	15,3	21,6	17	24	0,2
<b>62</b>	51	7000	33	60	22,9	37,5	26,5	38	0,47
	51	3600	44,6	108	29,2	62	34,5	49	0,48
	31	3800	44,6	61	35,8	48	44	63	0,45
	38	3200	60	78	41,3	47,5	24	34,5	0,47
	52	3000	31,4	52	21,2	32	22,8	35,5	0,42
<b>72</b>	58	6000	35,8	69,5	24,6	43	33,5	48	0,64
	58	3000	49,5	129	31,9	72	43	62	0,65
	38	3200	60	78	46,5	61	52	76,5	0,71
	40	2800	65,5	91,5	44	57	33,5	47,5	0,63
	56	2400	31,9	54	22,8	36,5	34	41,5	0,56
<b>80</b>	66	5300	46,8	95	31,9	57	41,5	58,5	0,80
	66	2600	60,5	160	39,1	88	51	73,5	0,89
	44	2800	65,5	91,5	49	68	57	81,5	0,86
	51	2400	91,3	134	57,2	72	32	45,5	0,82
	64	1800	36,5	68	24,5	42,5	35,5	45,5	0,70

## Support Rollers with axial guidance



Dimensions							Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	R	with spherized outer ring	with cylindrical outer ring
mm								
<b>85</b>	45	30	32	1,1	-	500	<b>NATR45</b>	<b>NATR45 X</b>
	45	30	32	1,1	0,6	500	<b>NUTR45</b>	<b>NUTR45 X</b>
	45	25,8	26	0,6	-	500	<b>STO45 2Z</b>	<b>STO45 2ZX</b>
<b>90</b>	50	30	32	1,1	-	500	<b>NATR50</b>	<b>NATR50 X</b>
	50	30	32	1,1	-	500	<b>NATV50</b>	<b>NATV50 X</b>
	40	30	32	1,1	0,6	500	<b>NUTR4090</b>	<b>NUTR4090 X</b>
	50	30	32	1,1	0,6	500	<b>NUTR50</b>	<b>NUTR50 X</b>
<b>100</b>	45	30	32	1,1	0,6	500	<b>NUTR45100</b>	<b>NUTR45100 X</b>
<b>110</b>	50	30	32	1,1	0,6	500	<b>NUTR50110</b>	<b>NUTR50110 X</b>

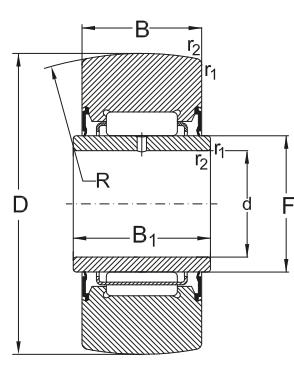
## Support Rollers with axial guidance



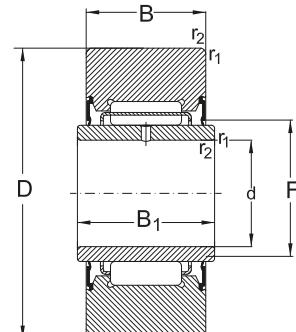
*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

Dimensions	Speed rating	Load ratings				max. permissible radial load		Mass kg
		as bearing dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	as support roller dyn. C <sub>LR</sub>	stat. C <sub>OLR</sub>	dyn. F <sub>r max</sub>	stat. F <sub>0r max</sub>	
D	D <sub>1</sub>	mm min <sup>-1</sup>		kN		kN		
<b>85</b>	72	5000	48,4	102	31,4	57	40	57 0,91
	55	2000	98,8	146	58,3	75	32,5	46,5 0,88
	69	1600	38	75	24,5	43	36,5	47,5 0,77
<b>90</b>	76	4500	50,1	108	30,8	58,5	40	57 0,96
	76	2000	67,1	193	39,1	93	50	72 1,00
	51	2400	91,3	134	68,2	91,5	63	90 1,16
	60	1900	101	160	58,3	78	32,5	47,5 0,95
<b>100</b>	55	2000	96,8	146	73,6	104	80	114 1,43
<b>110</b>	60	1900	101	160	78,1	116	98	140 1,73

## Sealed Support Rollers without axial guidance



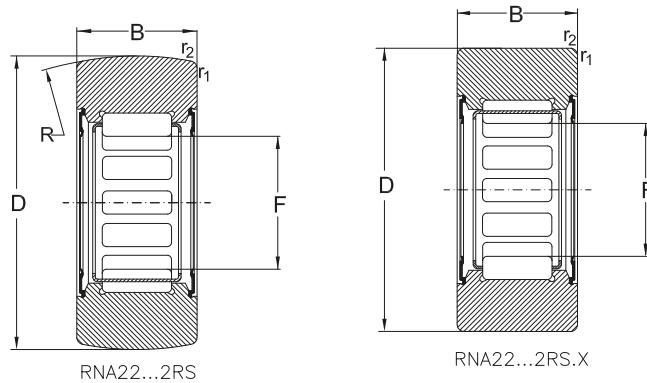
NA22...2RS



NA22...2RS.X

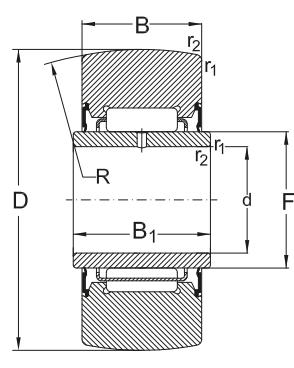
Dimensions							Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	R	with spherded outer ring	with cylindrical outer ring
mm								
<b>19</b>	-	-	11,8	0,3	-	500	<b>RNA22/6 2RS</b>	<b>RNA22/6 2RSX</b>
	6	12	11,8	0,3	0,3	500	<b>NA22/6 2RS</b>	<b>NA22/6 2RSX</b>
<b>24</b>	-	-	11,8	0,3	-	500	<b>RNA22/8 2RS</b>	<b>RNA22/8 2RSX</b>
	8	12	11,8	0,3	0,3	500	<b>NA22/8 2RS</b>	<b>NA22/8 2RSX</b>
<b>30</b>	-	-	13,8	0,6	-	500	<b>RNA2200 2RS</b>	<b>RNA2200 2RSX</b>
	10	14	13,8	0,6	0,3	500	<b>NA2200 2RS</b>	<b>NA2200 2RSX</b>
<b>32</b>	-	-	13,8	0,6	-	500	<b>RNA2201 2RS</b>	<b>RNA2201 2RSX</b>
	12	14	13,8	0,6	0,3	500	<b>NA2201 2RS</b>	<b>NA2201 2RSX</b>
<b>35</b>	-	-	13,8	0,6	-	500	<b>RNA2202 2RS</b>	<b>RNA2202 2RSX</b>
	15	14	13,8	0,6	0,3	500	<b>NA2202 2RS</b>	<b>NA2202 2RSX</b>
<b>40</b>	-	-	15,8	1	-	500	<b>RNA2203 2RS</b>	<b>RNA2203 2RSX</b>
	17	16	15,8	1	0,3	500	<b>NA2203 2RS</b>	<b>NA2203 2RSX</b>
<b>47</b>	-	-	17,8	1	-	500	<b>RNA2204 2RS</b>	<b>RNA2204 2RSX</b>
	20	18	17,8	1	0,3	500	<b>NA2204 2RS</b>	<b>NA2204 2RSX</b>

## Sealed Support Rollers without axial guidance

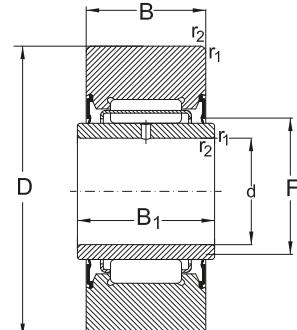


Dimensions	Speed rating	Load ratings				max. permissible radial load		Mass kg
		as bearing dyn. $C_r$	stat. $C_{0r}$	as support roller dyn. $C_{LR}$	stat. $C_{OLR}$	dyn. $F_{r\ max}$	stat. $F_{0r\ max}$	
D	F	mm	min <sup>-1</sup>	kN				
<b>19</b>	10	16000	4,5	4,1	3,5	3	1,9	2,8 0,01
	10	16000	4,5	4,1	3,5	3	1,9	2,8 0,02
<b>24</b>	12	14000	5,4	5,2	4,5	4,4	5	7,1 0,03
	12	14000	5,4	5,2	4,5	4,4	5	7,1 0,03
<b>30</b>	14	13000	7,4	8,2	6,4	7,2	12	17 0,05
	14	13000	7,4	8,2	6,4	7,2	12	17 0,06
<b>32</b>	16	12000	8,1	9,1	6,9	8,2	11,6	16,6 0,06
	16	12000	8,1	9,1	6,9	8,2	11,6	16,6 0,07
<b>35</b>	20	9500	9,1	12	7,2	9	9,6	13,7 0,06
	20	9500	9,1	12	7,2	9	9,6	13,7 0,07
<b>40</b>	22	9000	11,3	16,3	9,4	12,9	16	22,8 0,09
	22	9000	11,3	16,3	9,4	12,9	16	22,8 0,11
<b>47</b>	25	7500	19,4	22,4	15,4	17,3	17,6	25,5 0,15
	25	7500	19,4	22,4	15,4	17,3	17,6	25,5 0,18

## Sealed Support Rollers without axial guidance



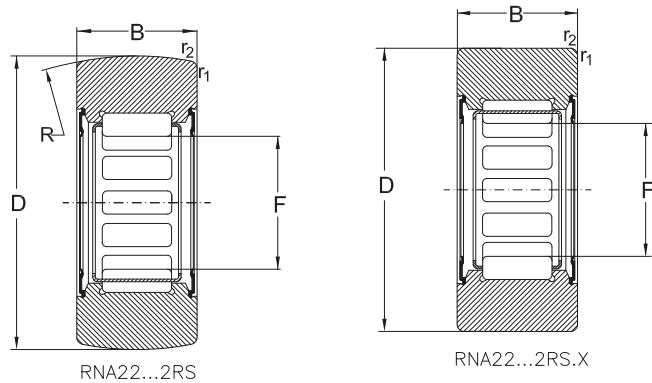
NA22...2RS



NA22...2RS.X

Dimensions							Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	r <sub>3</sub> , r <sub>4</sub> min.	R	with spherded outer ring	with cylindrical outer ring
mm								
<b>52</b>	-	-	17,8	1	-	500	<b>RNA2205 2RS</b>	<b>RNA2205 2RSX</b>
	25	18	17,8	1	0,3	500	<b>NA2205 2RS</b>	<b>NA2205 2RSX</b>
<b>62</b>	-	-	19,8	1	-	500	<b>RNA2206 2RS</b>	<b>RNA2206 2RSX</b>
	30	20	19,8	1	0,3	500	<b>NA2206 2RS</b>	<b>NA2206 2RSX</b>
<b>72</b>	-	-	22,7	1,1	-	500	<b>RNA2207 2RS</b>	<b>RNA2207 2RSX</b>
	35	23	22,7	1,1	0,6	500	<b>NA2207 2RS</b>	<b>NA2207 2RSX</b>
<b>80</b>	-	-	22,7	1,1	-	500	<b>RNA2208 2RS</b>	<b>RNA2208 2RSX</b>
	40	23	22,7	1,1	0,6	500	<b>NA2208 2RS</b>	<b>NA2208 2RSX</b>
<b>85</b>	-	-	22,7	1,1	-	500	<b>RNA2209 2RS</b>	<b>RNA2209 2RSX</b>
	45	23	22,7	1,1	0,6	500	<b>NA2209 2RS</b>	<b>NA2209 2RSX</b>
<b>90</b>	-	-	22,7	1,1	-	500	<b>RNA2210 2RS</b>	<b>RNA2210 2RSX</b>
	50	23	22,7	1,1	0,6	500	<b>NA2210 2RS</b>	<b>NA2210 2RSX</b>

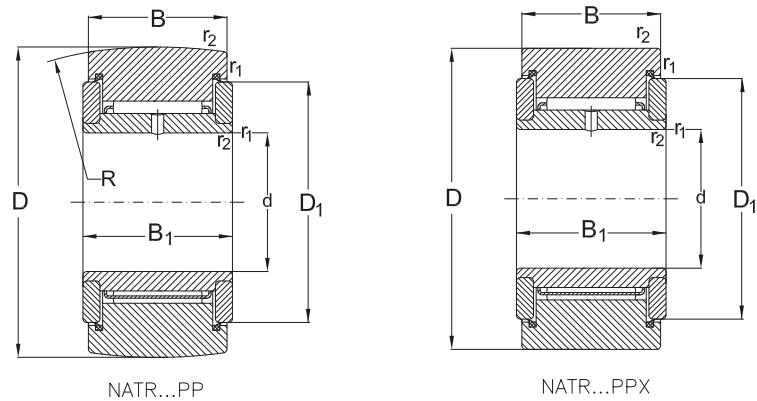
## Sealed Support Rollers without axial guidance



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

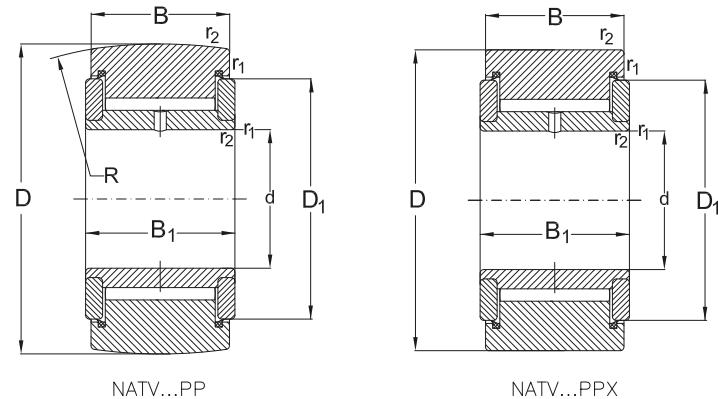
Dimensions	Speed rating	Load ratings				max. permissible radial load		Mass kg			
		as bearing		as support roller		dyn. $C_r$	stat. $C_{0r}$	dyn. $C_{LR}$	stat. $C_{OLR}$	dyn. $F_{r\ max}$	stat. $F_{0r\ max}$
D	F	min $^{-1}$		kN		kN					
<b>52</b>	30	6300	21,6	27,5	16,1	19	17,4	24,6	0,17		
	30	6300	21,6	27,5	16,1	19	17,4	24,6	0,20		
<b>62</b>	35	5600	22,4	32	17,6	24,5	28,5	40,5	0,29		
	35	5600	22,4	32	17,6	24,5	28,5	40,5	0,32		
<b>72</b>	42	4800	28,5	46,5	22	34	39	56	0,42		
	42	4800	28,5	46,5	22	34	39	56	0,49		
<b>80</b>	48	4000	36,9	58,5	27	39	37,5	53	0,515		
	48	4000	36,9	58,5	27	39	37,5	53	0,615		
<b>85</b>	52	3800	39	63	27,5	41,5	39	56	0,565		
	52	3800	39	63	27,5	41,5	39	56	0,661		
<b>90</b>	58	3400	40	71	27	41,5	36,5	52	0,59		
	58	3400	40	71	27	41,5	36,5	52	0,712		

## Sealed Support Rollers with axial guidance



Dimensions						Designation	
D	d	B	$B_1$	$r_1, r_2$ min.	R	with spherized outer ring	with cylindrical outer ring
mm							
<b>16</b>	5	11	12	0,1	500	<b>NATR5 PP</b>	<b>NATR5 PPX</b>
	5	11	12	0,1	500	<b>NATV5 PP</b>	<b>NATV5 PPX</b>
<b>19</b>	6	11	12	0,1	500	<b>NATR6 PP</b>	<b>NATR6 PPX</b>
	6	11	12	0,1	500	<b>NATV6 PP</b>	<b>NATV6 PPX</b>
<b>24</b>	8	14	15	0,3	500	<b>NATR8 PP</b>	<b>NATR8 PPX</b>
	8	14	15	0,3	500	<b>NATV8 PP</b>	<b>NATV8 PPX</b>
<b>30</b>	10	14	15	0,6	500	<b>NATR10 PP</b>	<b>NATR10 PPX</b>
	10	14	15	0,6	500	<b>NATV10 PP</b>	<b>NATV10 PPX</b>
<b>32</b>	12	14	15	0,6	500	<b>NATR12 PP</b>	<b>NATR12 PPX</b>
	12	14	15	0,6	500	<b>NATV12 PP</b>	<b>NATV12 PPX</b>
<b>35</b>	15	18	19	0,6	500	<b>NATR15 PP</b>	<b>NATR15 PPX</b>
	15	18	19	0,6	500	<b>NATV15 PP</b>	<b>NATV15 PPX</b>
<b>40</b>	17	20	21	1	500	<b>NATR17 PP</b>	<b>NATR17 PPX</b>
	17	20	21	1	500	<b>NATV17 PP</b>	<b>NATV17 PPX</b>
<b>47</b>	20	24	25	1	500	<b>NATR20 PP</b>	<b>NATR20 PPX</b>
	20	24	25	1	500	<b>NATV20 PP</b>	<b>NATV20 PPX</b>

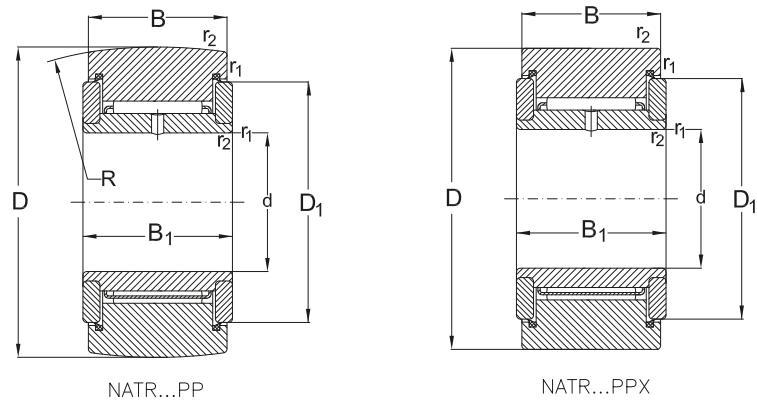
## Sealed Support Rollers with axial guidance



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

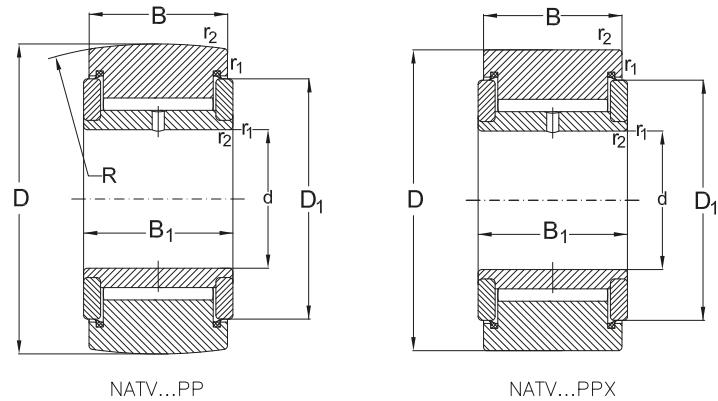
Dimensions	Speed rating	Load ratings as bearing		Load ratings as support roller		max. permissible radial load		Mass kg
		dyn. C <sub>r</sub>	stat. C <sub>0r</sub>	dyn. C <sub>LR</sub>	stat. C <sub>0LR</sub>	dyn. F <sub>r max</sub>	stat. F <sub>0r max</sub>	
D mm	F min <sup>-1</sup>	kN				kN		
<b>16</b>	12	20000	3,7	3,9	3,1	3,2	2,9	4,2 0,01
	12	11000	6	8,8	4,7	6,5	4	5,7 0,02
<b>19</b>	14	17000	4,15	4,8	3,25	3,8	3,45	5,5 0,02
	14	10000	6,9	11	5,3	8	5,1	7,3 0,02
<b>24</b>	19	15000	6,6	7,8	5,3	6,1	5,2	7,65 0,04
	19	8500	9,6	16	7,4	11,4	7,3	10,4 0,04
<b>30</b>	23	13000	7,8	9,65	6,4	8	7,1	11,2 0,07
	23	7500	11,4	19,3	8,9	14,6	11	15,6 0,07
<b>32</b>	25	11000	8,4	10,8	6,6	8,5	7,1	10 0,07
	25	7000	12,3	22	9,3	15,3	10,6	15 0,07
<b>35</b>	27	10000	12,3	19,3	9,5	13,7	11,4	16,3 0,10
	27	6700	17,2	35,5	12,3	23,2	14,6	20,8 0,11
<b>40</b>	32	9000	13,4	20,4	10,5	14,6	12,5	18 0,14
	32	5600	19,4	40	14,2	26,5	17	24,5 0,15
<b>47</b>	37	8000	18,7	32,5	14,7	24,5	23,6	33,5 0,25
	37	5300	26	60	19,4	41,5	30,5	43 0,26

## Sealed Support Rollers with axial guidance



Dimensions						Designation	
D	d	B	B <sub>1</sub>	r <sub>1</sub> , r <sub>2</sub> min.	R	with spheroid outer ring	with cylindrical outer ring
mm							
<b>52</b>	25	24	25	1	500	<b>NATR25 PP</b>	<b>NATR25 PPX</b>
	25	24	25	1	500	<b>NATV25 PP</b>	<b>NATV25 PPX</b>
<b>62</b>	30	28	29	1	500	<b>NATR30 PP</b>	<b>NATR 30 PPX</b>
	30	28	29	1	500	<b>NATV30 PP</b>	<b>NATV30 PPX</b>
<b>72</b>	35	28	29	1,1	500	<b>NATR35 PP</b>	<b>NATR35 PPX</b>
	35	28	29	1,1	500	<b>NATV35 PP</b>	<b>NATV35 PPX</b>
<b>80</b>	40	30	32	1,1	500	<b>NATR40 PP</b>	<b>NATR40 PPX</b>
	40	30	32	1,1	500	<b>NATV40 PP</b>	<b>NATV40 PPX</b>
<b>85</b>	45	30	32	1,1	500	<b>NATR45 PP</b>	<b>NATR45 PPX</b>
<b>90</b>	50	30	32	1,1	500	<b>NATR50 PP</b>	<b>NATR50 PPX</b>
	50	30	32	1,1	500	<b>NATV50 PP</b>	<b>NATV50 PPX</b>

## Sealed Support Rollers with axial guidance



*Recommended  
Abutment and  
fillet dimensions  
see on page 728*

Dimensions	Speed rating	Load ratings				max. permissible radial load		Mass
		as bearing	as support roller	dyn.	stat.	dyn.	stat.	
D	F	$C_r$	$C_{0r}$	$C_{LR}$	$C_{OLR}$	$F_{r\ max}$	$F_{0r\ max}$	
mm		min <sup>-1</sup>		kN		kN		kg
<b>52</b>	42	6700	20,5	38	14,7	25,5	21,6	31 0,28
	42	4300	28,6	72	19,8	44	28,5	40,5 0,29
<b>62</b>	51	5300	33	60	22,9	37,5	26,5	38 0,47
	51	3600	44,6	108	29,2	62	34,5	49 0,48
<b>72</b>	58	4500	38,5	69,5	24,6	43	33,5	48 0,64
	58	3000	49,5	129	31,9	72	43	62 0,65
<b>80</b>	66	4000	46,8	95	31,9	57	41,5	58,5 0,80
	66	2600	60,5	160	39,1	88	51	73,5 0,89
<b>85</b>	72	3600	48,4	102	31,4	57	40	57 0,91
<b>90</b>	76	3400	50,1	108	30,8	58,5	40	57 0,96
	76	2000	67,1	193	39,1	93	50	72 1,00



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URB

# Rolling Elements

## General

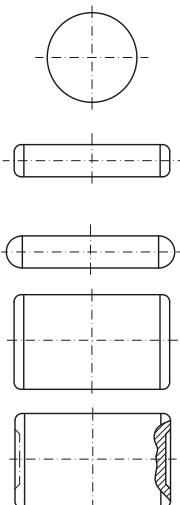
**Rolling Elements** are simple geometric bodies that are produced to very high precision standard by the rolling bearing industry.

Rolling elements are made from hardened bearing steel. They have fine ground or even superfinished surfaces as standard.

Rolling elements such as Balls, Cylindrical Rollers and Needle Rollers are used in a wide variety of Rolling Bearings for a whole spectrum of applications and industries.

Additional to the use in rolling bearings, individual rolling elements are frequently used separately or loose for other requirements or applications, such as Valve Balls, Gauge Rollers, Cycles wheels etc.

The more popular sizes are normally available and supplied loose from stock.



## Balls

Standard, Boundary dimensions

Balls of through - hardening  
rolling bearing steel DIN 5401 / Part 1  
ISO 3290

## Hardness

Balls made from through - hardened rolling bearing steel according to DIN 17 230 generally, have the following hardness values and ranges as stated in the table below.

Ball diameter DW [mm]		Hardness [HRC]	
>	≤	>	≤
-	12,7	62	67
12,7	50,8	60	66
50,8	70	59	65
70	120	57	63
120	-	55	61

## Ball grades, Tolerances

**URB** balls from rolling bearing steel are supplied according to the following tolerances.

The balls are clasified and graded according to their diameters, each grade is sorted into individual ball gauges, each gauge is separately packaged.

Each package is clearly identified with ball diameter, grade and gauge. Where there are no specific grade and gauge requirements readily available standard ball diameters will be despatched.

## Symbols

<b>D<sub>w</sub></b>	nominal ball diameter
<b>D<sub>ws</sub></b>	Single diameter of a ball. Distance between two parallel planes that contact the surface of the ball.
<b>D<sub>wm</sub></b>	Mean ball diameter. Arithmetical mean of largest and smallest (measured) single ball diameter.
<b>Lot</b>	A defined quantity of balls that have been manufactured under uniform conditions and have therefore similar characteristics.
<b>D<sub>wml</sub></b>	Mean ball diameter of a ball lot Arithmetical mean of largest and smallest mean ball diameter ( <b>D<sub>wm</sub></b> ) within a lot.
<b>V<sub>dw</sub>s</b>	Variation of ball diameter. Difference between largest and smallest measured single diameter of one ball, ( <b>D<sub>ws</sub></b> )
<b>V<sub>dwL</sub></b>	Variation of ball diameters within a lot. Difference between largest and smallest mean ball diameter, ( <b>D<sub>wm</sub></b> ) within a lot.
<b>tDW</b>	Deviation from spherical form as defined by DIN ISO 1011.
<b>Gauge</b>	The amount by which the lot mean diameter, ( <b>D<sub>wml</sub></b> ), differs from the nominal ball diameter, ( <b>D<sub>w</sub></b> ). This amount being one of a defined series. Each ball gauge is a whole multiple of ball gauge interval ( <b>I</b> ).
<b>I</b>	Ball gauge interval; Amount in which the permissible deviation of ball diameter is divided.
<b>R<sub>a</sub></b>	Surface finish roughness, according to DIN 4768
<b>Grade</b>	Defined combination of quality features such as dimensional and geometrical accuracy, surface roughness, shape and gauge intervals of a specific ball.

**Tolerance Values for hardened balls from rolling bearing steel  
according to ISO 3290**

Ball Grade	Tolerances						Gauge interval I	Gauge mean values (deviation range)		
	$\Phi D_w$	$V_{Dws}$	$t_{Dw}$	$R_a$	$V_{DwL}$					
	mm	μm	μm	μm	μm					
<b>G3</b>	- 12,7	0,08	0,08	0,012	0,13	0,5	-5 ... -0,5	0	+0,5 ... +5	
<b>G5</b>	- 12,7	0,13	0,13	0,020	0,25	1	-5 ... -1	0	+1 ... +5	
<b>G10</b>	- 25,4	0,25	0,25	0,025	0,5	1	-9 ... -1	0	+1 ... +9	
<b>G16</b>	- 25,4	0,4	0,4	0,032	0,8	2	-10 ... -2	0	+2 ... +10	
<b>G20</b>	- 25,4	0,5	0,5	0,040	1	2	-10 ... -2	0	+2 ... +10	
<b>G28</b>	25,4 50,8	0,7	0,7	0,050	1,4	2	-12 ... -2	0	+2 ... +12	
<b>G40</b>	- 101,6	1	1	0,080	2	4	-16 ... -4	0	+4 ... +16	
<b>G100</b>	101,6 152,4	2,5	2,5	0,125	5	5	-20 ... -5	0	+5 ... +20	
	152,4 175	2,5	2,5	0,125	5	10	-40 ... -10	0	+10 ... +40	
<b>G200</b>	175 250	5	5	0,200	10	15	-60 ... -15	0	+15 ... +60	
<b>G500</b>	- 25,4	13	13	0,200	-	50	-50	0	+50	
	25,4 50,8	19	19	0,200	-	75	-75	0	+75	
	50,8 76,2	25	25	0,200	-	100	-100	0	+100	
	76,2 101,6	32	32	0,200	-	125	-125	0	+125	
	101,6 127	38	38	0,200	-	150	-150	0	+150	
	127 152,4	44	44	0,400	-	175	-175	0	+175	
<b>G600</b>	all	-	-	-	-	400	-	0	-	
<b>G700</b>	all	-	-	-	-	2000	-	0	-	

## Designation

Balls are classified according to their diameters, each grade and gauge is separately packed and despatched.

**URB** balls made from chromium rolling bearing steel are designated following the system as shown below:

### RB 12,7 G10 P4

where:

**RB** Symbols for balls made from chromium rolling bearing steel

**12,7** Nominal ball diameter  $D_w$  [mm]

**G10** Grade **G10**

**P4** Gauge **P4**

(the mean deviation of this specific lot equals +4  $\mu\text{m}$ )

To avoid possible misinterpretations by poor visible printings etc. the **mean deviation** is stated according to the following system:

**P** **Plus**

e.g. **P4** = mean deviation + 4  $\mu\text{m}$

**N** 0

**M** **Minus**

e.g. **M3** = mean deviation - 3  $\mu\text{m}$

Therefore, the mean diameter deviation of a ball from a specific lot is

**12,704 mm  $\pm$  0,5  $\mu\text{m}$**

For a ball with the designation **RB 5,556 G3 M2**, the mean diameter deviation would be:

**5,554  $\pm$  0,25  $\mu\text{m}$**

## Balls from other materials

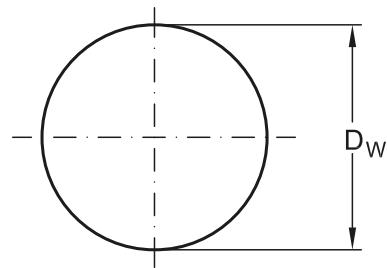
Additional to the balls produced from chromium bearing steel, **URB** also produce balls suitable for different purposes from alternative materials.

Examples are balls of:

mild steel, unhardened  
stainless steel  
bronze  
brass, etc.

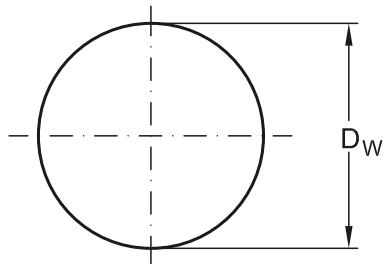
**URB** will provide detailed information on request.

## Steel Balls



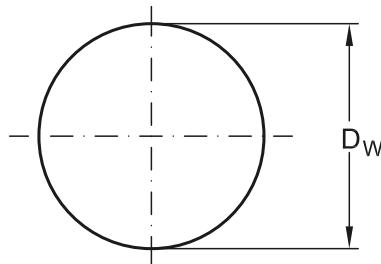
Ball diameter, $D_w$		Designation	Mass per 100 balls
mm	inch		kg
0,4	-	<b>RB 0,4</b>	0,0001
0,5	-	<b>RB 0,5</b>	0,0001
1	-	<b>RB 1</b>	0,0004
1,5	-	<b>RB 1,5</b>	0,0014
1,588	1/16	<b>RB 1,588</b>	0,0016
2	-	<b>RB 2</b>	0,0033
2,381	3/32	<b>RB 2,381</b>	0,0055
2,5	-	<b>RB 2,5</b>	0,0064
3	-	<b>RB 3</b>	0,0111
3,175	1/8	<b>RB 3,175</b>	0,0132
3,5	-	<b>RB 3,5</b>	0,0177
3,969	5/32	<b>RB 3,969</b>	0,0257
4	-	<b>RB 4</b>	0,0263
4,5	-	<b>RB 4,5</b>	0,0374
4,762	3/16	<b>RB 4,762</b>	0,0446
5	-	<b>RB 5</b>	0,0514
5,5	-	<b>RB 5,5</b>	0,0679
5,556	7/32	<b>RB 5,556</b>	0,702
6	-	<b>RB 6</b>	0,0882
6,350	1/4	<b>RB 6,350</b>	0,103
6,5	-	<b>RB 6,5</b>	0,113
7	-	<b>RB 7</b>	0,141
7,144	9/32	<b>RB 7,144</b>	0,150
7,5	-	<b>RB 7,5</b>	0,174
7,938	5/16	<b>RB 7,938</b>	0,106

## Steel Balls



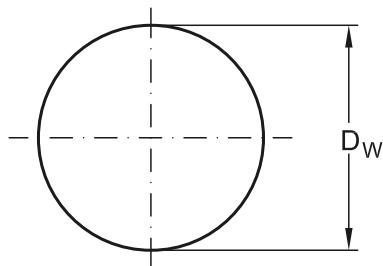
Ball diameter, $D_w$		Designation	Mass per 100 balls
mm	inch		kg
8	-	<b>RB 8</b>	0,210
8,5	-	<b>RB 8,5</b>	0,220
<b>8,731</b>	<b>11/32</b>	<b>RB 8,731</b>	0,266
9	-	<b>RB 9</b>	0,330
<b>9,525</b>	<b>3/8</b>	<b>RB 9,525</b>	0,355
10	-	<b>RB 10</b>	0,411
<b>10,319</b>	<b>13/32</b>	<b>RB 10,319</b>	0,443
<b>10,5</b>	-	<b>RB 10,5</b>	0,476
11	-	<b>RB 11</b>	0,547
<b>11,112</b>	<b>7/16</b>	<b>RB 11,112</b>	0,564
<b>11,5</b>	-	<b>RB 11,5</b>	0,625
<b>11,906</b>	<b>15/32</b>	<b>RB 11,906</b>	0,693
12	-	<b>RB 12</b>	0,710
<b>12,5</b>	-	<b>RB 12,5</b>	0,803
<b>12,700</b>	<b>1/2</b>	<b>RB 12,700</b>	0,842
13	-	<b>RB 13</b>	0,903
<b>13,494</b>	<b>17/32</b>	<b>RB 13,494</b>	1,01
14	-	<b>RB 14</b>	1,13
<b>14,288</b>	<b>9/16</b>	<b>RB 14,288</b>	1,20
15	-	<b>RB 15</b>	1,39
<b>15,081</b>	<b>19/32</b>	<b>RB 15,081</b>	1,41
<b>15,875</b>	<b>5/8</b>	<b>RB 15,875</b>	1,65
16	-	<b>RB 16</b>	1,68
<b>16,5</b>	-	<b>RB 16,5</b>	1,85
<b>16,669</b>	<b>21/32</b>	<b>RB 16,669</b>	1,91

## Steel Balls



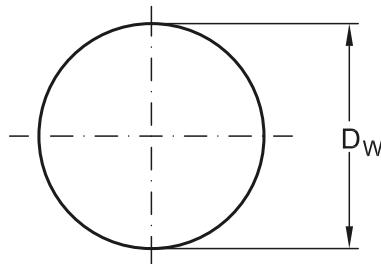
Ball diameter, $D_w$		Designation	Mass per 100 balls
mm	inch		kg
17	-	<b>RB 17</b>	2,02
17,462	11/16	<b>RB 17,462</b>	2,19
18	-	<b>RB 18</b>	2,40
18,256	23/32	<b>RB 18,256</b>	2,50
19	-	<b>RB 19</b>	2,82
19,050	3/4	<b>RB 19,050</b>	2,84
19,844	25/32	<b>RB 19,844</b>	3,24
20	-	<b>RB 20</b>	3,29
20,5	-	<b>RB 20,5</b>	3,54
20,638	13/16	<b>RB 20,638</b>	3,62
21	-	<b>RB 21</b>	3,81
22	-	<b>RB 22</b>	4,38
22,225	7/8	<b>RB 22,225</b>	4,52
22,5	-	<b>RB 22,5</b>	4,68
23	-	<b>RB 23</b>	5,00
23,812	15/16	<b>RB 23,812</b>	5,55
24	-	<b>RB 24</b>	5,68
25	-	<b>RB 25</b>	6,42
25,400	1	<b>RB 25,400</b>	6,74
26	-	<b>RB 26</b>	7,23
26,988	1 1/16	<b>RB 26,988</b>	8,08
28	-	<b>RB 28</b>	9,02
28,575	1 1/8	<b>RB 28,575</b>	9,55
30	-	<b>RB 30</b>	11,1
30,162	1 3/16	<b>RB 30,162</b>	11,3

## Steel Balls



Ball diameter, $D_w$		Designation	Mass per 100 balls
mm	inch		kg
31,750	1 1/4	<b>RB 31,750</b>	13,2
32	-	<b>RB 32</b>	13,5
33	-	<b>RB 33</b>	14,8
33,338	1 5/16	<b>RB 33,338</b>	15,2
34	-	<b>RB 34</b>	16,2
34,925	1 3/8	<b>RB 34,925</b>	17,5
35	-	<b>RB 35</b>	17,7
36	-	<b>RB 36</b>	19,2
36,512	1 7/16	<b>RB 36,512</b>	20,0
38	-	<b>RB 38</b>	22,5
38,100	1 1/2	<b>RB 38,100</b>	22,7
39,688	1 9/16	<b>RB 39,688</b>	25,7
40	-	<b>RB 40</b>	26,3
41,275	1 5/8	<b>RB 41,275</b>	29,0
42,862	1 11/16	<b>RB 42,862</b>	32,4
44,450	1 3/4	<b>RB 44,450</b>	36,1
45	-	<b>RB 45</b>	37,4
46,038	1 13/16	<b>RB 46,038</b>	40,3
47,625	1 7/8	<b>RB 47,625</b>	44,6
49,212	1 15/16	<b>RB 49,212</b>	49,0
50	-	<b>RB 50</b>	51,4
50,800	2	<b>RB 50,800</b>	53,9
53,975	2 1/8	<b>RB 53,975</b>	64,6
55	-	<b>RB 55</b>	67,9
57,15	2 1/4	<b>RB 57,15</b>	76,7

## Steel Balls



Ball diameter, $D_w$		Designation	Mass per 100 balls
mm	inch		kg
60	-	<b>RB 60</b>	88,2
60,325	2 3/8	<b>RB 60,325</b>	90,2
63,500	2 1/2	<b>RB 63,500</b>	103
65	-	<b>RB 65</b>	113
66,675	2 5/8	<b>RB 66,675</b>	122
69,850	2 3/4	<b>RB 69,850</b>	140
70	-	<b>RB 70</b>	141
73,025	2 7/8	<b>RB 73,025</b>	160
75	-	<b>RB 75</b>	174
76,200	3	<b>RB 76,200</b>	182
80	-	<b>RB 80</b>	210
82,550	3 1/4	<b>RB 82,550</b>	231
85	-	<b>RB 85</b>	252
88,900	3 1/2	<b>RB 88,900</b>	289
90	-	<b>RB 90</b>	300
95	-	<b>RB 95</b>	352
95,250	3 3/4	<b>RB 95,250</b>	355
100	-	<b>RB 100</b>	411
110	-	<b>RB 110</b>	547
120	-	<b>RB 120</b>	710
127	5	<b>RB 127</b>	842
150	-	<b>RB 150</b>	1390
200	-	<b>RB 200</b>	3290
250	-	<b>RB 250</b>	6420

## Cylindrical Rollers

### Standards, Boundary dimensions

Cylindrical rollers of Through-hardening  
Rolling bearings steel DIN 5402/part 1

### Hardness

**URB** cylindrical rollers made from through-hardened rolling bearing steel according to DIN 17 230 have a surface hardness of **58** up to **65 HRC**.

### Design features

**URB cylindrical rollers** are produced using the latest technology, with the modified surface profile (i.e. semi-crowned) as standard (see sketch below).

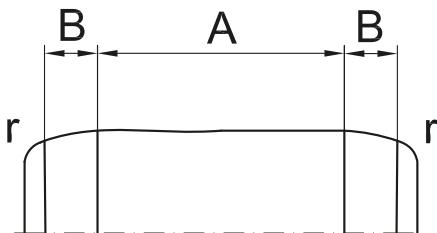
This modified profile features a cylindrical centre diameter (**A**) that blends into a slightly curved area (**B**) which blends into the roller radii (**r**) and end face.

This feature reduces considerably the negative effect of edge loading and, therefore, additional stresses.

For manufacturing reasons, small cylindrical rollers may have shallow dimples in their end faces.

Such dimples have a depth of approximately 0,5 mm, the diameter is approximately half the nominal roller diameter (**D<sub>w</sub>**).

In cases where such dimpled cylindrical rollers are unsuitable for application reasons, it must be clearly stated on the order.

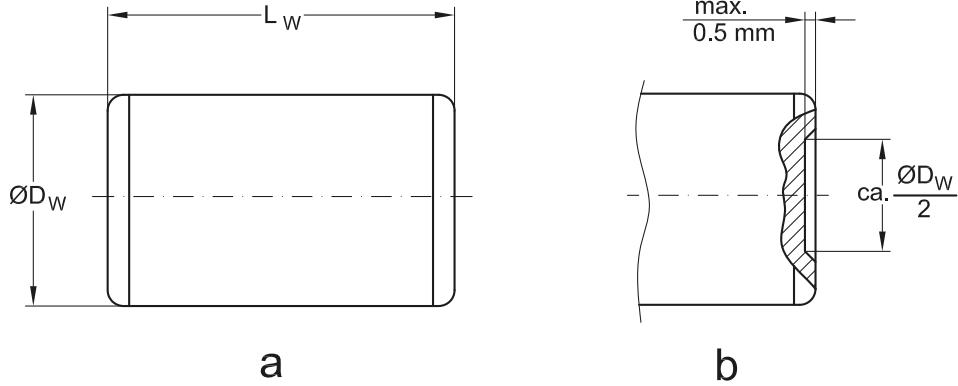


### Tolerances for URB Cylindrical Rollers

Values of dimensional and geometrical accuracy of **URB** cylindrical rollers

Roller diameter Nominal $\Phi D_w$	Tolerances		Gauge interval $I$	Gauge mean values (deviation range)	Roundness tolerance to DIN ISO 1101
mm	min.	max.	μm	μm	μm
- 26	-17	+11	2	-8 ... -1 0 +1 ... +6	1
26 40	-19,5	+10,5	3	-9 ... -1,5 0 +1,5 ... +6	1,2

Roller length Nominal $L_w$	Tolerances		Gauge interval $I$	Gauge mean values (deviation range)	Tolerance of end face runout to DIN ISO 1101
mm	min.	max.	μm	μm	μm
- 48	-20	+10	6	-18 / -12 / -6 / 0 / +6	6
48	-45	+15	10	-30 / -20 / -10 / 0 / +10	10



#### Grades, Tolerances

**URB cylindrical rollers** are classified and graded according to their nominal diameters and lengths. Each grade is sorted into gauge ranges, each gauge is separately package.

Each package is clearly identified with the mean gauge interval of both, cylindrical roller diameter and roller length.

Where there are no specific Grade or gauge requirements specified the standard available cylindrical roller stock size will be despatched.

#### Designation

Cylindrical Rollers are classified according to their nominal diameters and lengths, each individual grade and gauge is separately packed and despatched.

**URB Cylindrical Rollers** made from chromium rolling bearing steel are designated following the system as shown below:

#### RC 6,5X9 P2/M6

where:

- RC** Symbol for cylindrical rollers from chromium rolling bearing steel
- 6,5** Nominal roller diameter,  $D_w$  [mm]
- 9** Nominal roller length,  $L_w$  [mm]
- P2** Diameter gauge **P2**  
(the mean deviation of roller diameter of this specific lot equals + 2  $\mu\text{m}$ )
- M6** Length gauge **M6**  
(the mean deviation of roller lenght of

this specific lot is - 6  $\mu\text{m}$ )

To avoid possible misinterpretations by poor visible printings etc., the **mean deviation** is stated acording to the following system:

<b>P</b>	<b>Plus</b>
	e.g. <b>P2</b> = mean deviation + 2 $\mu\text{m}$
<b>N</b>	<b>0</b>
<b>M</b>	<b>Minus</b>
	e.g. <b>M6</b> = mean deviation - 6 $\mu\text{m}$

Therefore, the **mean diameter deviation** of a cylindrical roller from this specific lot is

**6,502 mm  $\pm 1 \mu\text{m}$ .**

The **mean roller length deviation** of a cylindrical roller from a specific lot is

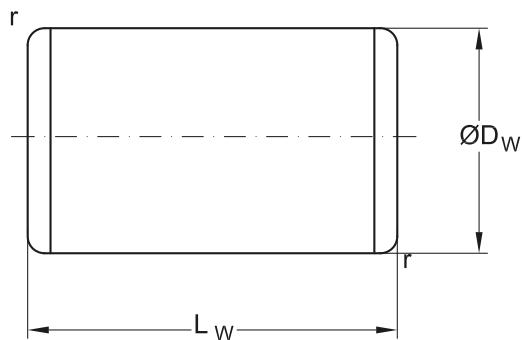
**8,994 mm  $\pm 3 \mu\text{m}$ .**

#### Cylindrical Rollers to other Tolerances

URB also produces cylindrical rollers with reduced tolerances to customer order requirements.

URB will provide detailed information on request.

## Cylindrical Rollers

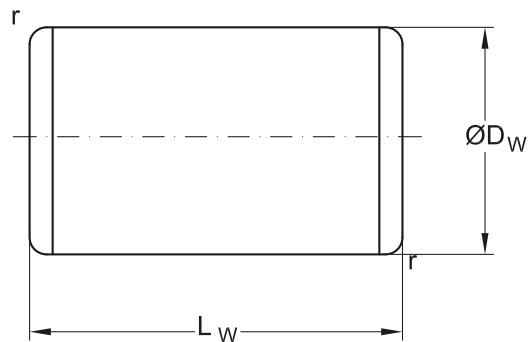


Dimensions				Designation	Mass per 100 rollers
$D_W$	$L_W$	$r_{min}$	$r_{max}$		kg
		mm			
<b>3</b>	5	0,2	0,4	<b>RC 3 X 5</b>	0,027
<b>3,5</b>	5	0,2	0,4	<b>RC 3,5 X 5</b>	0,037
	8	0,2	0,4	<b>RC 3,5 X 8</b>	0,060
<b>4</b>	4	0,2	0,4	<b>RC 4 X 4</b>	0,038
	6	0,2	0,4	<b>RC 4 X 6</b>	0,058
	8	0,2	0,4	<b>RC 4 X 8</b>	0,078
<b>4,5</b>	6	0,2	0,6	<b>RC 4,5 X 6</b>	0,073
<b>5</b>	5	0,2	0,6	<b>RC 5 X 5</b>	0,075
	6	0,2	0,6	<b>RC 5 X 6</b>	0,091
	7	0,2	0,6	<b>RC 5 X 7</b>	0,106
	8	0,2	0,6	<b>RC 5 X 8</b>	0,121
	10	0,2	0,6	<b>RC 5 X 10</b>	0,152
<b>5,5</b>	5,5	0,2	0,6	<b>RC 5,5 X 5,5</b>	0,100
	8	0,2	0,6	<b>RC 5,5 X 8</b>	0,146
<b>6</b>	6	0,2	0,6	<b>RC 6 X 6</b>	0,130
	8	0,2	0,6	<b>RC 6 X 8</b>	0,178
	12	0,2	0,6	<b>RC 6 X 12</b>	0,261
<b>6,5</b>	6,5	0,2	0,6	<b>RC 6,5 X 6,5</b>	0,166
	9	0,2	0,6	<b>RC 6,5 X 9</b>	0,230

## Cylindrical Rollers

Dimensions				Designation	Mass per 100 rollers
D <sub>w</sub>	L <sub>w</sub>	r <sub>min</sub>	r <sub>max</sub>		kg
<b>7</b>	7	0,2	0,6	<b>RC 7 X 7</b>	0,206
	10	0,2	0,6	<b>RC 7 X 10</b>	0,30
	14	0,2	0,6	<b>RC 7 X 14</b>	0,42
<b>7,5</b>	7,5	0,2	0,6	<b>RC 7,5 X 7,5</b>	0,25
	11	0,2	0,6	<b>RC 7,5 X 11</b>	0,37
<b>8</b>	8	0,2	0,6	<b>RC 8 X 8</b>	0,31
	12	0,2	0,6	<b>RC 8 X 12</b>	0,47
<b>9</b>	9	0,3	0,7	<b>RC 9 X 9</b>	0,44
	14	0,3	0,7	<b>RC 9 X 14</b>	0,68
<b>10</b>	10	0,3	0,7	<b>RC 10 X 10</b>	0,60
	14	0,3	0,7	<b>RC 10 X 14</b>	0,85
<b>11</b>	11	0,3	0,7	<b>RC 11 X 11</b>	0,81
	15	0,3	0,7	<b>RC 11 X 15</b>	1,10
<b>12</b>	12	0,3	0,7	<b>RC 12 X 12</b>	1,04
	18	0,3	0,7	<b>RC 12 X 18</b>	1,57
<b>13</b>	13	0,4	0,8	<b>RC 13 X 13</b>	1,33
	20	0,4	0,8	<b>RC 13 X 20</b>	2,04
<b>14</b>	14	0,4	0,8	<b>RC 14 X 14</b>	1,66
	20	0,4	0,8	<b>RC 14 X 20</b>	2,38

## Cylindrical Rollers



Dimensions				Designation	Mass per 100 rollers
$D_W$	$L_W$	$r_{min}$	$r_{max}$		kg
<b>15</b>	15	0,4	0,8	<b>RC 15 X 15</b>	2,04
	22	0,4	0,8	<b>RC 15 X 22</b>	3,00
<b>16</b>	16	0,4	0,8	<b>RC 16 X 16</b>	2,48
	24	0,4	0,8	<b>RC 16 X 24</b>	3,73
<b>17</b>	17	0,4	1	<b>RC 17 X 17</b>	2,97
	24	0,4	1	<b>RC 17 X 24</b>	4,20
<b>18</b>	18	0,4	1	<b>RC 18 X 18</b>	3,57
	26	0,4	1	<b>RC 18 X 26</b>	5,10
<b>19</b>	19	0,4	1	<b>RC 19 X 19</b>	4,16
	28	0,4	1	<b>RC 19 X 28</b>	6,10
<b>20</b>	20	0,4	1	<b>RC 20 X 20</b>	4,85
	30	0,4	1	<b>RC 20 X 30</b>	7,30
<b>21</b>	21	0,5	1,1	<b>RC 21 X 21</b>	5,60
	30	0,5	1,1	<b>RC 21 X 30</b>	8,0
<b>22</b>	22	0,5	1,1	<b>RC 22 X 22</b>	6,4
	34	0,5	1,1	<b>RC 22 X 34</b>	10,0
<b>23</b>	23	0,5	1,1	<b>RC 23 X 23</b>	7,4
	34	0,5	1,1	<b>RC 23 X 34</b>	11,2
<b>24</b>	24	0,5	1,1	<b>RC 24 X 24</b>	8,4

## Cylindrical Rollers

Dimensions				Designation	Mass per 100 rollers
D <sub>w</sub>	L <sub>w</sub>	r <sub>min</sub>	r <sub>max</sub>		kg
24	36	0,5	1,1	RC 24 X 36	12,6
25	25	0,5	1,1	RC 25 X 25	9,5
	36	0,5	1,1	RC 25 X 36	13,7
26	26	0,5	1,1	RC 26 X 26	10,7
	40	0,5	1,1	RC 26 X 40	16,4
28	28	0,6	1,4	RC 28 X 28	13,3
	44	0,6	1,4	RC 28 X 44	21,0
30	30	0,6	1,4	RC 30 X 30	16,3
	48	0,6	1,4	RC 30 X 48	26,2
32	32	0,6	1,4	RC 32 X 32	19,9
	52	0,6	1,4	RC 32 X 52	32,4
34	34	0,6	1,4	RC 34 X 34	23,9
	55	0,6	1,4	RC 34 X 55	38,7
36	36	0,7	1,7	RC 36 X 36	28,3
	58	0,7	1,7	RC 36 X 58	45,7
38	38	0,7	1,7	RC 38 X 38	33,3
	62	0,7	1,7	RC 38 X 62	55,0
40	40	0,7	1,7	RC 40 X 40	38,9
	65	0,7	1,7	RC 40 X 65	63,0

## Needle Rollers

### Standards, Boundary dimensions

Needle rollers of through-hardened rolling bearing steel DIN 5402 / part 3

### Hardness

**URB - needle rollers** made from through-hardened rolling bearing steel according to DIN 17 230 generally, have a hardness value range of **58 to 65 HRC**.

### Design features

**URB Needle Rollers** are produced using the latest technology.

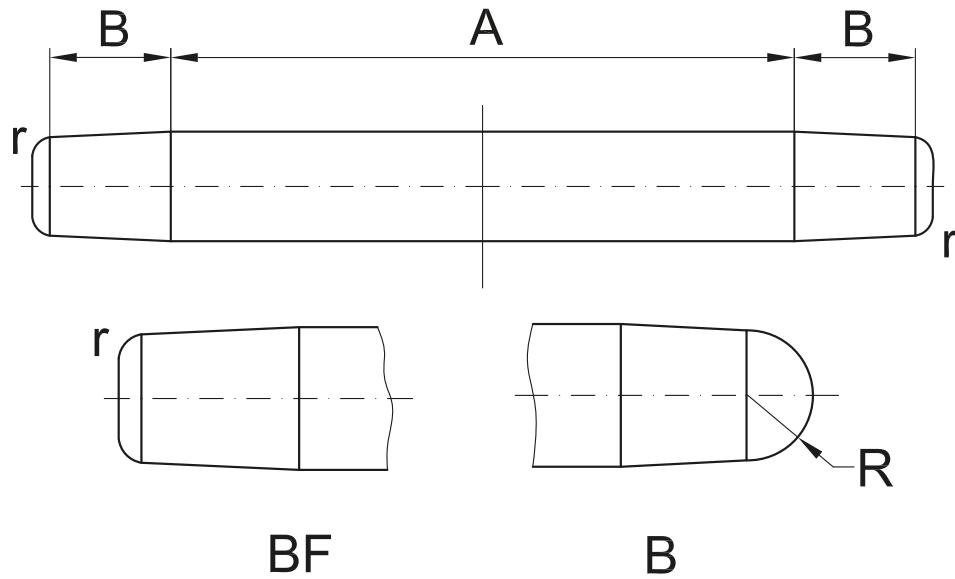
One detail of outstanding importance to needle rollers is the modified profile that is established as a standard for all **URB needle rollers**, see sketch below.

The modified profile features a cylindrical section in the centre (**A**) that blends into a slightly curved area (**B**) which blends into the roller radii (**r**) and end face.

This feature reduces considerably the potentially negative effect of edge loading and, therefore, additional stresses.

Needle rollers are available in two different designs as standard (see sketch below).

Needle rollers of type "**B**" have spherical end faces, whilst needle rollers of the "**BF**" - design are produced with flat ends.



### Grades, tolerances

**URB Needle rollers** are classified and graded according to their diameters into three **Grades** (**G2, G3 and G5**).

Furthermore, the needle diameters of every grade are subdivided in **gauges**.

The tolerance ranges of each gauge are different depending on the grade.

Each package is clearly identified with the nominal needle roller diameter, grade, individual gauge range and length.

Each gauge is packed and despatched separately.

Where there is no specific grade and/or gauge requirements G2-Needle rollers from available stock sizes will be despatched.

The **length tolerances** of needle rollers correspond uniformly to ISO tolerance field **h13**.

Values of dimensional and geometrical accuracy of URB Needle Rollers

Grade	Tolerances		Gauge internal	Gauges (limit values)	Roundness tolerance
	min.	max.	I	μm	μm
mm	μm		μm	μm	μm
<b>G2</b>	-10	0	2	0 / -2, -1 / -3, -2 / -4, -3 / -5, -4 / -6 -5 / -7, -6 / -8, -7 / -9, -8 / -10	1
<b>G3</b>	-10	0	3	0 / -3, -1,5 // -4,5, -3 / -6, -4,5 / -7,5, -6 / -9, -7 / -10	1,2
<b>G5</b>	-10	0	5	0 / -5, -3 / -8, -5 / -10	2,5

The lenght tolerance of needle rollers correspond uniformly to ISO tolerance field h13.

### Designation

The URB designation system for needle rollers made from chromium rolling bearing steel follows the system as shown bellow:

#### RN 2X13,8 BF M2/M4 G2

where:

**RN** Symbols for needle rollers from chromium rolling bearing steel

**2** Nominal diameter of needle roller  
**D<sub>w</sub>** [mm]

**13,8** Nominal lenght of needle roller,  
**L<sub>w</sub>** [mm]

**BF** Needle rollers with flat ends

**M2/M4** Diameter gauge **M2/M4**  
 (the physical roller diameter size of this specific lot lies between 1,998 to 1,996 mm)

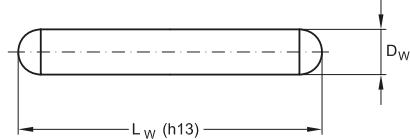
**G2** Grade of needle rollers

To avoid possible misinterpretation by poor visible printings, etc., the **diameter** gauges are stated acording the following system:

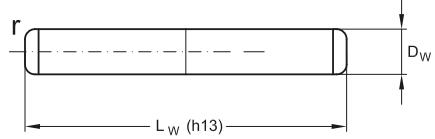
**N** **0**

**M** **Minus**  
 e.g. **M2/M4 = -2 / -4 μm**

## Needle Rollers



B



BF

Dimensions				Designation		Mass per 100 needles
D <sub>w</sub>	L <sub>w</sub>	r <sub>min</sub>	r <sub>max</sub>	"Sphered end" type	"Flat end" type	kg
mm						
<b>1,5</b>	5,8	0,1	0,4	<b>RN 1,5 X 5,8 B</b>	<b>RN 1,5 X 5,8 BF</b>	0,008
	7,8	0,1	0,4	<b>RN 1,5 X 7,8 B</b>	<b>RN 1,5 X 7,8 BF</b>	0,011
	9,8	0,1	0,4	<b>RN 1,5 X 9,8 B</b>	<b>RN 1,5 X 9,8 BF</b>	0,013
	11,8	0,1	0,4	<b>RN 1,5 X 11,8 B</b>	<b>RN 1,5 X 11,8 BF</b>	0,016
	13,8	0,1	0,4	<b>RN 1,5 X 13,8 B</b>	<b>RN 1,5 X 13,8 BF</b>	0,020
<b>2</b>	7,8	0,1	0,4	<b>RN 2 X 7,8 B</b>	<b>RN 2 X 7,8 BF</b>	0,02
	9,8	0,1	0,4	<b>RN 2 X 9,8 B</b>	<b>RN 2 X 9,8 BF</b>	0,02
	11,8	0,1	0,4	<b>RN 2 X 11,8 B</b>	<b>RN 2 X 11,8 BF</b>	0,03
	13,8	0,1	0,4	<b>RN 2 X 13,8 B</b>	<b>RN 2 X 13,8 BF</b>	0,03
	15,8	0,1	0,4	<b>RN 2 X 15,8 B</b>	<b>RN 2 X 15,8 BF</b>	0,04
	17,8	0,1	0,4	<b>RN 2 X 17,8 B</b>	<b>RN 2 X 17,8 BF</b>	0,04
	19,8	0,1	0,4	<b>RN 2 X 19,8 B</b>	<b>RN 2 X 19,8 BF</b>	0,05
	21,8	0,1	0,4	<b>RN 2 X 21,8 B</b>	<b>RN 2 X 21,8 BF</b>	0,05
<b>2,5</b>	7,8	0,1	0,4	<b>RN 2,5 X 7,8 B</b>	<b>RN 2,5 X 7,8 BF</b>	0,03
	9,8	0,1	0,4	<b>RN 2,5 X 9,8 B</b>	<b>RN 2,5 X 9,8 BF</b>	0,04
	11,8	0,1	0,4	<b>RN 2,5 X 11,8 B</b>	<b>RN 2,5 X 11,8 BF</b>	0,05
	13,8	0,1	0,4	<b>RN 2,5 X 13,8 B</b>	<b>RN 2,5 X 13,8 BF</b>	0,05

## Needle Rollers

Dimensions				Designation		Mass per 100 needles
D <sub>w</sub>	L <sub>w</sub>	r <sub>min</sub>	r <sub>max</sub>	"Sphered end" type	"Flat end" type	kg
mm						
2,5	15,8	0,1	0,4	RN 2,5 X 15,8 B	RN 2,5 X 15,8 BF	0,06
	17,8	0,1	0,4	RN 2,5 X 17,8 B	RN 2,5 X 17,8 BF	0,07
	19,8	0,1	0,4	RN 2,5 X 19,8 B	RN 2,5 X 19,8 BF	0,08
	21,8	0,1	0,4	RN 2,5 X 21,8 B	RN 2,5 X 21,8 BF	0,08
	23,8	0,1	0,4	RN 2,5 X 23,8 B	RN 2,5 X 23,8 BF	0,09
3	9,8	0,1	0,4	RN 3 X 9,8 B	RN 3 X 9,8 BF	0,05
	11,8	0,1	0,4	RN 3 X 11,8 B	RN 3 X 11,8 BF	0,07
	13,8	0,1	0,4	RN 3 X 13,8 B	RN 3 X 13,8 BF	0,08
	15,8	0,1	0,4	RN 3 X 15,8 B	RN 3 X 15,8 BF	0,09
	17,8	0,1	0,4	RN 3 X 17,8 B	RN 3 X 17,8 BF	0,10
	19,8	0,1	0,4	RN 3 X 19,8 B	RN 3 X 19,8 BF	0,11
	23,8	0,1	0,4	RN 3 X 23,8 B	RN 3 X 23,8 BF	0,13
	27,8	0,1	0,6	RN 3 X 27,8 B	RN 3 X 27,8 BF	0,15
3,5	29,8	0,1	0,6	RN 3,5 X 29,8 B	RN 3,5 X 29,8 BF	0,23
	34,8	0,1	0,6	RN 3,5 X 34,8 B	RN 3,5 X 34,8 BF	0,27
4	39,8	0,1	0,6	RN 4 X 39,8 B	RN 4 X 39,8 BF	0,40
5	49,8	0,1	0,6	RN 5 X 49,8 B	RN 5 X 49,8 BF	0,75



# Adapter and Withdrawal Sleeves

## General

**Adapter and Withdrawal Sleeves** are devices using to mount and secure rolling element bearings with tapered bores onto cylindrical shaft seats.

This enables the mounting or dismounting of rolling element bearings in a simple and effective way to for a variety of applications.

Since, adapter and withdrawal sleeves are able to adapt to shaft diameter variations within certain limits, larger than normal **shaft diameter tolerances** are accommodated.

The **geometrical accuracy**, however, must be more closely defined, as the forms errors of the shaft affect the running accuracy of the total bearing arrangement in a direct way.

Furthermore, using adapter or withdrawal sleeves allows bearing seats with lower surface qualities, (e.g. turned surfaces) to be acceptable. For applications where no accurate shaft guidance of bearings is required, bright drawn round bar stock may also be used.

Generally the following tolerances may be used for guidance:

Expected running accuracy	Diameter tolerance	Form accuracy
Normal	h7, h8, h9	IT <sub>5</sub> 2
Low	h10, h11	IT <sub>7</sub> 2

## Adapter sleeves

### Standards, boundary, dimensions

Adapter Sleeves

DIN 5415

### General

**Adapter sleeves** (see sketch below) are slotted steel sleeves that have a tapered outer diameter, taper 1:12 on one side and a thread on the opposite side.

Small adapter sleeves may have phosphated surfaces, normally they are only oil preserved.

**URB adapter sleeves** are supplied complete with lock nut and locking washer as standard.

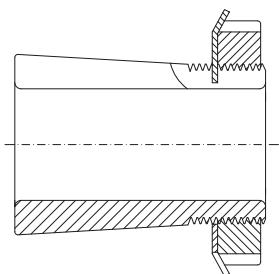
Beside the standard design (see figure **a**), there are also larger adapter sleeves available with oil bores and oil distribution ducts, (prefix **OH**) as required for applying the oil injection method as shown in figure **b**.

On smooth straight shafts, (e.g. on a drawn round stock), adapter sleeves allow a simple positioning of bearings in any position, (see figure **c**).

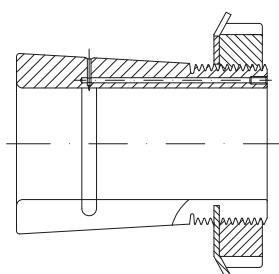
In applications where bearings with adapter sleeves are mounted on straight shafts without axial support, (see figure **c**), their ability to accept axial forces is limited by the friction between the adapter sleeve and the shaft.

In the case of higher axial forces, the bearing needs to be secured additionally by **supporting rings** (see figure **d**).

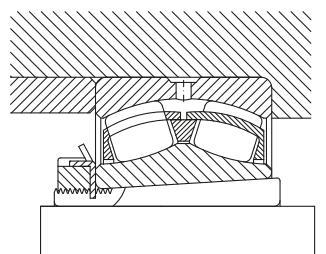
When designing such supporting rings, however, the abutment dimensions recommended by the product tables must be considered.



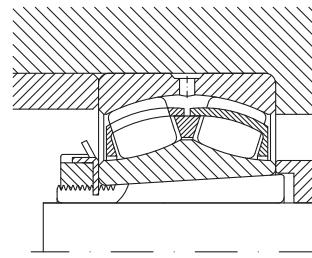
a



b



c



d

**URB GROUP**

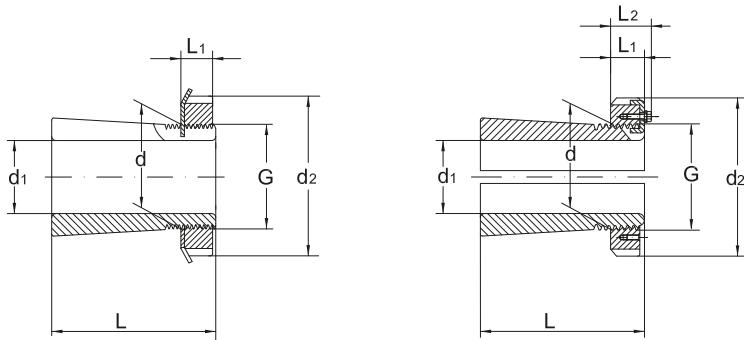
URB-ROMANIA CART-TURKEY MGM-HUNGARY



URB

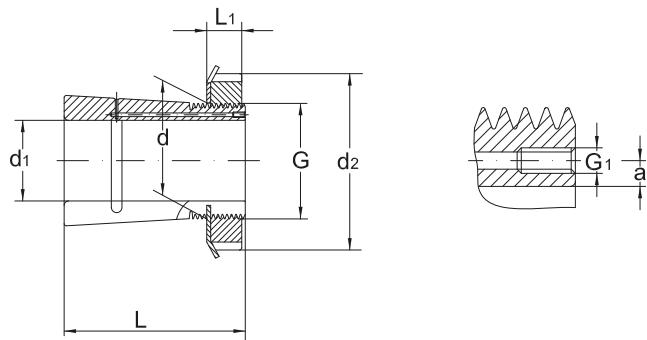
772

## Adapter Sleeves



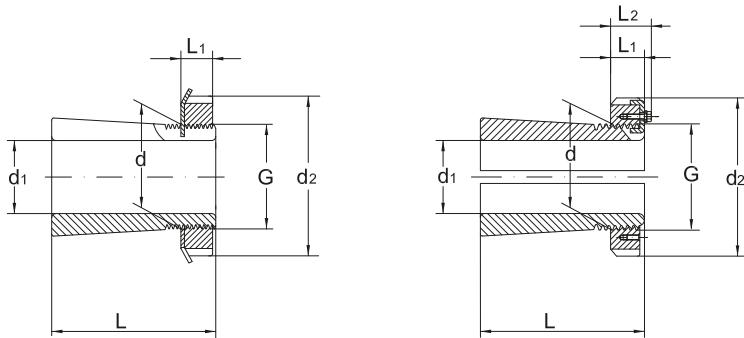
Shaft Ø mm	Dimension			Designation adapter sleeve, complete	Mass kg
	d <sub>1</sub>	d	d <sub>2</sub>		
<b>17</b>	20	32	24	<b>H204</b>	0,04
		32	28	<b>H304</b>	0,04
		32	31	<b>H2304</b>	0,05
<b>20</b>	25	38	26	<b>H205</b>	0,06
		38	29	<b>H305</b>	0,07
		38	35	<b>H2305</b>	0,09
<b>25</b>	30	45	27	<b>H206</b>	0,09
		45	31	<b>H306</b>	0,10
		45	38	<b>H2306</b>	0,11
<b>30</b>	35	52	29	<b>H207</b>	0,12
		52	35	<b>H307</b>	0,14
		52	43	<b>H2307</b>	0,15
<b>35</b>	40	58	31	<b>H208</b>	0,16
		58	36	<b>H308</b>	0,18
		58	46	<b>H2308</b>	0,22
<b>40</b>	45	65	33	<b>H209</b>	0,21
		65	39	<b>H309</b>	0,23
		65	50	<b>H2309</b>	0,27
<b>45</b>	50	70	35	<b>H210</b>	0,24
		70	42	<b>H310</b>	0,27
		70	55	<b>H2310</b>	0,34
<b>50</b>	55	75	37	<b>H211</b>	0,28
		75	45	<b>H311</b>	0,32
		75	59	<b>H2311</b>	0,39

## Adapter Sleeves



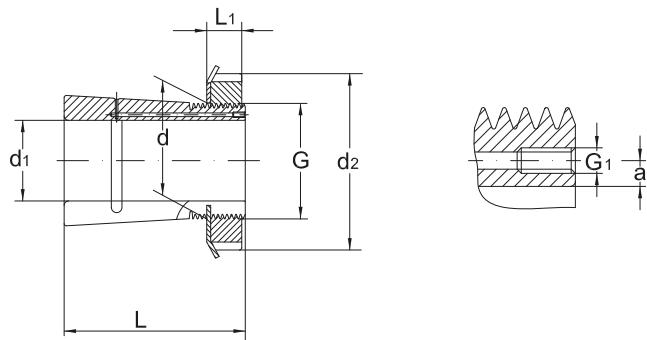
Shaft Ø	Thread	Dimensions						Lock nut	Locking Device
		$d_1$	$G$	$L_1$	$L_2$	$G_1$	$a$		
<b>mm</b>									
<b>17</b>	M 20 X 1	7	-	-	-	-	-	MK4	MB4
	M 20 X 1	7	-	-	-	-	-	MK4	MB4
	M 20 X 1	7	-	-	-	-	-	MK4	MB4
<b>20</b>	M 25 X 1,5	8	-	-	-	-	-	MK5	MB5
	M 25 X 1,5	8	-	-	-	-	-	MK5	MB5
	M 25 X 1,5	8	-	-	-	-	-	MK5	MB5
<b>25</b>	M 30 X 1,5	8	-	-	-	-	-	MK6	MB6
	M 30 X 1,5	8	-	-	-	-	-	MK6	MB6
	M 30 X 1,5	8	-	-	-	-	-	MK6	MB6
<b>30</b>	M 35 X 1,5	9	-	-	-	-	-	MK7	MB7
	M 35 X 1,5	9	-	-	-	-	-	MK7	MB7
	M 35 X 1,5	9	-	-	-	-	-	MK7	MB7
<b>35</b>	M 40 X 1,5	10	-	-	-	-	-	MK8	MB8
	M 40 X 1,5	10	-	-	-	-	-	MK8	MB8
	M 40 X 1,5	10	-	-	-	-	-	MK8	MB8
<b>40</b>	M 45 X 1,5	11	-	-	-	-	-	MK9	MB9
	M 45 X 1,5	11	-	-	-	-	-	MK9	MB9
	M 45 X 1,5	11	-	-	-	-	-	MK9	MB9
<b>45</b>	M 50 X 1,5	12	-	-	-	-	-	MK10	MB10
	M 50 X 1,5	12	-	-	-	-	-	MK10	MB10
	M 50 X 1,5	12	-	-	-	-	-	MK10	MB10
<b>50</b>	M 55 X 2	12,5	-	-	-	-	-	MK11	MB11
	M 55 X 2	12,5	-	-	-	-	-	MK11	MB11
	M 55 X 2	12,5	-	-	-	-	-	MK11	MB11

## Adapter Sleeves



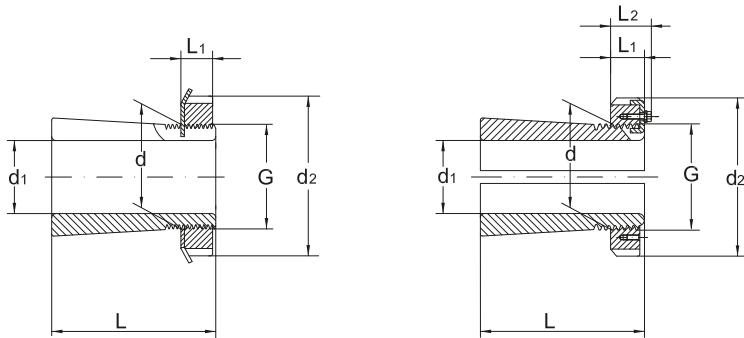
Shaft Ø d <sub>1</sub> mm	Dimension			Designation adapter sleeve, complete	Mass kg
	d mm	d <sub>2</sub> mm	L mm		
<b>55</b>	60	80	38	<b>H212</b>	0,31
		80	47	<b>H312</b>	0,35
		80	62	<b>H2312</b>	0,45
<b>60</b>	65	85	40	<b>H213</b>	0,36
	65	85	50	<b>H313</b>	0,42
	65	85	65	<b>H2313</b>	0,52
	70	92	52	<b>H314</b>	0,68
	70	92	68	<b>H2314</b>	0,88
<b>65</b>	75	98	43	<b>H215</b>	0,66
		98	55	<b>H315</b>	0,78
		98	73	<b>H2315</b>	1,1
<b>70</b>	80	105	46	<b>H216</b>	0,81
		105	59	<b>H316</b>	0,95
		105	78	<b>H2316</b>	1,2
<b>75</b>	85	110	50	<b>H217</b>	0,94
		110	63	<b>H317</b>	1,1
		110	82	<b>H2317</b>	1,35
<b>80</b>	90	120	52	<b>H218</b>	1,1
		120	65	<b>H318</b>	1,3
		120	86	<b>H2318</b>	1,6
<b>85</b>	95	125	55	<b>H219</b>	1,25
		125	68	<b>H319</b>	1,4
		125	90	<b>H2319</b>	1,8
<b>90</b>	100	130	58	<b>H220</b>	1,4

## Adapter Sleeves



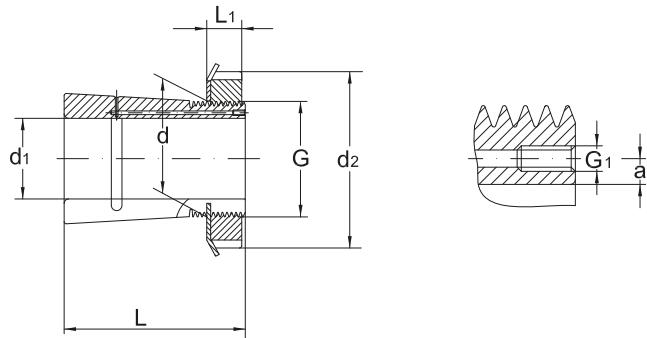
Shaft Ø	Thread	Dimensions						Lock nut	Locking Device
		$d_1$	$G$	$L_1$	$L_2$	$G_1$	$a$		
<b>mm</b>									
<b>55</b>	M 60 X 2	13	-	-	-	-	-	KM12	MB 12
	M 60 X 2	13	-	-	-	-	-	KM12	MB12
	M 60 X 2	13	-	-	-	-	-	KM12	MB12
<b>60</b>	M 65 X 2	14	-	-	-	-	-	KM13	MB13
	M 65 X 2	14	-	-	-	-	-	KM13	MB13
	M 65 X 2	14	-	-	-	-	-	KM13	MB13
	M 70 X 2	14	-	-	-	-	-	KM14	MB14
	M 70 X 2	14	-	-	-	-	-	KM14	MB14
<b>65</b>	M 75 X 2	15	-	-	-	-	-	KM15	MB15
	M 75 X 2	15	-	-	-	-	-	KM15	MB15
	M 75 X 2	15	-	-	-	-	-	KM15	MB15
<b>70</b>	M 80 X 2	17	-	-	-	-	-	KM16	MB16
	M 80 X 2	17	-	-	-	-	-	KM16	MB16
	M 80 X 2	17	-	-	-	-	-	KM16	MB16
<b>75</b>	M 85 X 2	18	-	-	-	-	-	KM17	MB17
	M 85 X 2	18	-	-	-	-	-	KM17	MB17
	M 85 X 2	18	-	-	-	-	-	KM17	MB17
<b>80</b>	M 90 X 2	18	-	-	-	-	-	KM18	MB18
	M 90 X 2	18	-	-	-	-	-	KM18	MB18
	M 90 X 2	18	-	-	-	-	-	KM18	MB18
<b>85</b>	M 95 X 2	19	-	-	-	-	-	KM19	MB19
	M 95 X 2	19	-	-	-	-	-	KM19	MB19
	M 95 X 2	19	-	-	-	-	-	KM19	MB19
<b>90</b>	M 100 X 2	20	-	-	-	-	-	KM20	MB20

## Adapter Sleeves



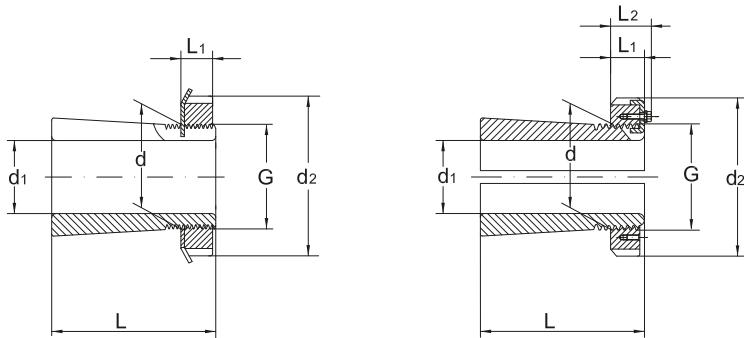
Shaft Ø d <sub>1</sub>	Dimension d	Dimension d <sub>2</sub>	Dimension L	Designation adapter sleeve, complete	Mass kg
mm	mm				
<b>90</b>	100	130	71	<b>H320</b>	1,6
		130	97	<b>H2320</b>	2
	105	130	76	<b>H3120</b>	1,8
<b>95</b>		140	60	<b>H221</b>	1,6
		140	74	<b>H321</b>	1,85
<b>100</b>	110	145	63	<b>H222</b>	1,8
		145	77	<b>H322</b>	2,05
		145	105	<b>H2322</b>	2,75
		145	81	<b>H3122</b>	2,1
<b>110</b>	120	155	112	<b>H2324</b>	3
		145	72	<b>H3024</b>	1,8
		155	88	<b>H3124</b>	2,5
<b>115</b>	130	165	121	<b>H2326</b>	4,45
		155	80	<b>H3026</b>	2,8
		165	92	<b>H3126</b>	3,45
<b>125</b>	140	180	131	<b>H2328</b>	5,4
		165	82	<b>H3028</b>	3,05
		180	97	<b>H3128</b>	4,1
<b>135</b>	150	195	139	<b>H2330</b>	6,4
		180	87	<b>H3030</b>	3,75
		195	111	<b>H3130</b>	5,25
<b>140</b>	160	210	147	<b>H2332</b>	8,8
		210	147	<b>OH2332 H</b>	8,8
		190	93	<b>H3032</b>	5,1

## Adapter Sleeves



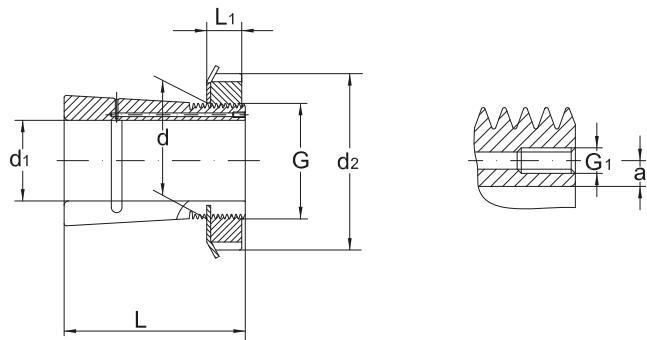
Shaft Ø	Thread	Dimensions					Lock nut	Locking Device
d <sub>1</sub>	G	L <sub>1</sub>	L <sub>2</sub>	G <sub>1</sub>	a			
<b>mm</b>								
<b>90</b>	M 100 X 2	20	-	-	-	-	KM20	MB20
	M 100 X 2	20	-	-	-	-	KM20	MB20
	M 100 X 2	20	-	-	-	-	KM20	MB20
<b>95</b>	M 105 X 2	20	-	-	-	-	KM21	MB21
	M 105 X 2	20	-	-	-	-	KM21	MB21
<b>100</b>	M 110 X 2	21	-	-	-	-	KM22	MB22
	M 110 X 2	21	-	-	-	-	KM22	MB22
	M 110 X 2	21	-	-	-	-	KM22	MB22
	M 110 X 2	31	-	-	-	-	KM22	MB22
<b>110</b>	M 120 X 2	22	-	-	-	-	KM24	MB24
	M 120 X 2	22	-	-	-	-	KML24	MBL24
	M 120 X 2	22	-	-	-	-	KM24	MB24
<b>115</b>	M 130 X 2	23	-	-	-	-	KM26	MB26
	M 130 X 2	23	-	-	-	-	KML26	MBL26
	M 130 X 2	23	-	-	-	-	KM26	MB26
<b>125</b>	M 140 X 2	24	-	-	-	-	KM28	MB28
	M 140 X 2	24	-	-	-	-	KML28	MBL28
	M 140 X 2	24	-	-	-	-	KM28	MB28
<b>135</b>	M 150 X 2	26	-	-	-	-	KM30	MB30
	M 150 X 2	26	-	-	-	-	KML30	MBL30
	M 150 X 2	26	-	-	-	-	KM30	MB30
<b>140</b>	M 160 X 3	28	-	-	-	-	KM32	MB32
	M 160 X 3	28	-	M 6	4,2	-	KM32	MB32
	M 160 X 3	27,5	-	-	-	-	KML32	MBL32

## Adapter Sleeves



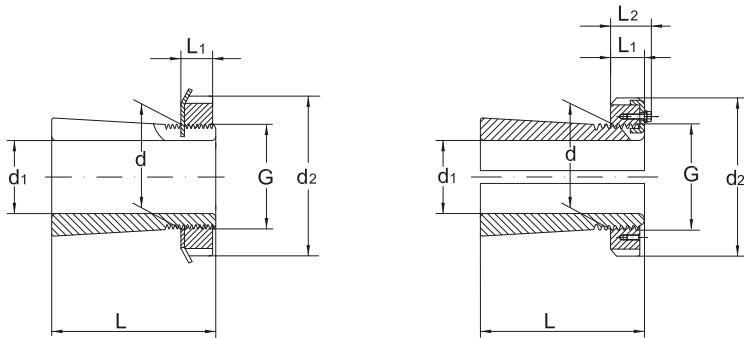
Shaft Ø mm	Dimension			L	Designation adapter sleeve, complete	Mass kg
	d <sub>1</sub>	d	d <sub>2</sub>			
<b>140</b>	160	190	93	93	<b>OH3032 H</b>	5,1
		210	119	119	<b>H3132</b>	7,25
		210	119	119	<b>OH3132 H</b>	7,25
<b>150</b>	170	220	154	154	<b>H2334</b>	9,9
		220	154	154	<b>OH2334 H</b>	9,9
		200	101	101	<b>H3034</b>	5,8
		200	101	101	<b>OH3034 H</b>	5,8
		220	101	101	<b>H3134</b>	8,1
		220	122	122	<b>OH3134 H</b>	8,1
<b>160</b>	180	230	161	161	<b>H2336</b>	11
		230	161	161	<b>OH2336 H</b>	11
		210	109	109	<b>H3036</b>	6,7
		210	109	109	<b>OH3036 H</b>	6,7
		230	131	131	<b>H3136</b>	9,15
		230	131	131	<b>OH3136 H</b>	9,15
<b>170</b>	190	240	169	169	<b>H2338</b>	12
		240	169	169	<b>OH2338 H</b>	12
		220	112	112	<b>H3038</b>	7,25
		220	112	112	<b>OH3038 H</b>	7,25
		240	141	141	<b>H3138</b>	10,5
		240	141	141	<b>OH3138 H</b>	10,5
<b>180</b>	200	250	176	176	<b>H2340</b>	13,5
		250	176	176	<b>OH2340 H</b>	13,5
		240	120	120	<b>H3040</b>	8,9

## Adapter Sleeves



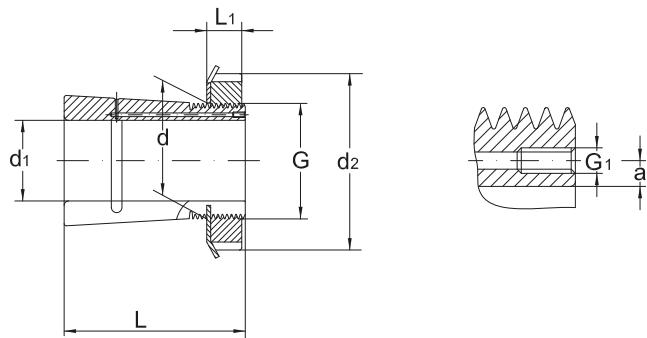
Shaft Ø	Thread	Dimensions				Lock nut	Locking Device		
		$d_1$	$G$	$L_1$	$L_2$	$G_1$	$a$		
mm									
<b>140</b>	M 160 X 3	27,5	-			M 6	4,2	KML32	MBL32
	M 160 X 3	28	-			-	-	KM32	MB32
	M 160 X 3	28	-			M 6	4,2	KM32	MB32
<b>150</b>	M 170 X 3	29	-			-	-	KM34	MB34
	M 170 X 3	29	-			M 6	4,2	KM34	MB34
	M 170 X 3	28,5	-			-	-	KML34	MBL34
	M 170 X 3	28,5	-			M 6	4,2	KML34	MBL34
	M 170 X 3	29	-			-	-	KM34	MB34
	M 170 X 3	29	-			M 6	4,2	KM34	MB34
<b>160</b>	M 180 X 3	30	-			-	-	KM36	MB36
	M 180 X 3	30	-			M 6	4,2	KM36	MB36
	M 180 X 3	29,5	-			-	-	KML36	MBL36
	M 180 X 3	29,5	-			M 6	4,2	KML36	MBL36
	M 180 X 3	30	-			-	-	KM36	MB36
	M 180 X 3	30	-			M 6	4,2	KM36	MB36
<b>170</b>	M 190 X 3	31	-			-	-	KM38	MB38
	M 190 X 3	31	-			M 6	4,2	KM38	MB38
	M 190 X 3	30,5	-			-	-	KML38	MBL38
	M 190 X 3	30,5	-			M 6	4,2	KML38	MBL38
	M 190 X 3	31	-			-	-	KM38	MB38
	M 190 X 3	31	-			M 6	4,2	KM38	MB38
<b>180</b>	M 200 X 3	32	-			-	-	KM40	MB40
	M 200 X 3	32	-			M 6	4,2	KM40	MB40
	M 200 X 3	31,5	-			-	-	KML40	MBL40

## Adapter Sleeves



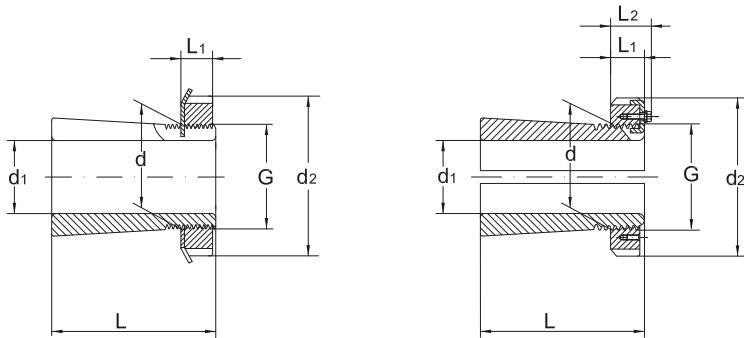
Shaft Ø mm	Dimension			Designation adapter sleeve, complete	Mass kg
	d <sub>1</sub>	d	d <sub>2</sub>		
<b>180</b>	200	240	120	<b>OH3040 H</b>	8,9
		250	150	<b>H3140</b>	12
		250	150	<b>OH3140 H</b>	12
<b>200</b>	220	280	186	<b>H2344</b>	17
		280	186	<b>OH2344 H</b>	17
		260	126	<b>H3044</b>	9,9
		260	126	<b>OH3044 H</b>	9,9
		280	161	<b>H3144</b>	15
		280	161	<b>OH3144 H</b>	15
<b>220</b>	240	300	199	<b>H2348</b>	19
		300	199	<b>OH2348 H</b>	19
		290	133	<b>H3048</b>	12
		290	133	<b>OH3048 H</b>	12
		300	172	<b>H3148</b>	16
		300	172	<b>OH3148 H</b>	16
<b>240</b>	260	330	211	<b>H2352</b>	23
		330	211	<b>OH2352 H</b>	23
		310	145	<b>H3052</b>	13,5
		310	145	<b>OH3052 H</b>	13,5
		330	190	<b>H3152</b>	21
		330	190	<b>OH3152 H</b>	21
<b>260</b>	280	350	224	<b>H2356</b>	27
		350	224	<b>OH2356 H</b>	27
		330	152	<b>H3056</b>	16
		330	152	<b>OH3056 H</b>	16

## Adapter Sleeves



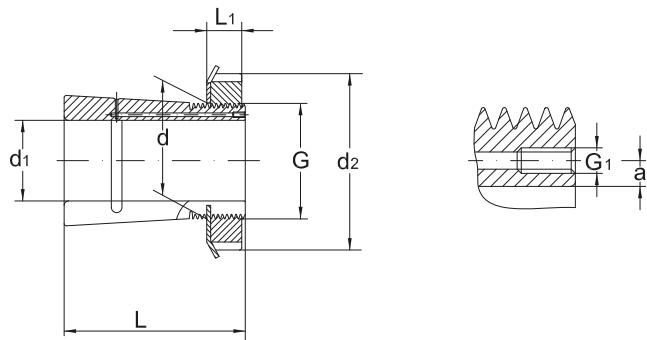
Shaft Ø	Thread	Dimensions					Lock nut	Locking Device
		$d_1$	$G$	$L_1$	$L_2$	$G_1$		
<b>mm</b>								
<b>180</b>	M 200 X 3	31,5	-			M6	4,2	KML40 MBL40
	M 200 X 3	32	-			-	-	KM40 MB40
	M 200 X 3	32	-			M6	4,2	KM40 MB40
<b>200</b>	Tr 220 X 4	35	-			-	-	HM44 T MB44
	Tr 220 X 4	35	-			M6	4,2	HM44 T MB44
	Tr 220 X 4	30	41			-	-	HM3044 MS3044
	Tr 220 X 4	30	41			M6	4,2	HM3044 MS3044
	Tr 220 X 4	35	-			-	-	HM44 T MB44
	Tr 220 X 4	35	-			M6	4,2	HM44 T MB44
<b>220</b>	Tr 240 X 4	37	-			-	-	HM48 T MB48
	Tr 240 X 4	37	-			M6	4,2	HM48 T MB48
	Tr 240 X 4	34	46			-	-	HM3048 MS3052-48
	Tr 240 X 4	34	46			M6	4,2	HM3048 MS3052-48
	Tr 240 X 4	37	-			-	-	HM48 T MB48
	Tr 240 X 4	37	-			M6	4,2	HM48 T MB48
<b>240</b>	Tr 260 X 4	39	-			-	-	HM52 T MB52
	Tr 260 X 4	39	-			M6	4,2	HM52 T MB52
	Tr 260 X 4	34	46			-	-	HM3052 MS3052-48
	Tr 260 X 4	34	46			M6	4,2	HM3052 MS3052-48
	Tr 260 X 4	39	-			-	-	HM52 T MB52
	Tr 280 X 4	39	-			M6	4,2	HM52 T MB52
<b>260</b>	Tr 280 X 4	41	-			-	-	HM56 T MB56
	Tr 280 X 4	41	-			M6	4,2	HM56 T MB56
	Tr 280 X 4	38	50			-	-	HM3056 MS3056
	Tr 280 X 4	38	50			M6	4,2	HM3056 MS3056

## Adapter Sleeves



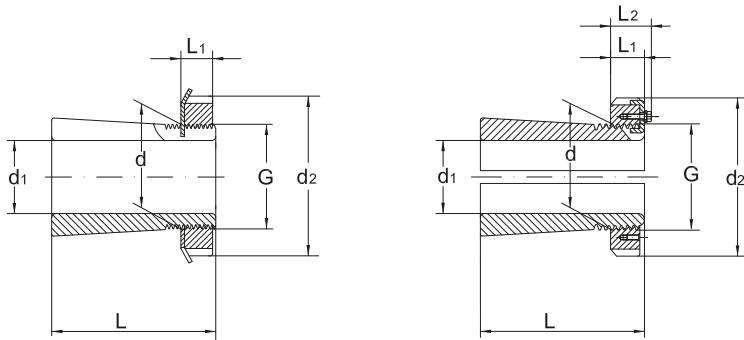
Shaft Ø d <sub>1</sub>	Dimension			Designation adapter sleeve, complete	Mass kg
	d	d <sub>2</sub>	L		
<b>260</b>	280	350	195	<b>H3156</b>	23
		350	195	<b>OH3156 H</b>	23
<b>280</b>	300	360	168	<b>H3060</b>	20,5
		360	168	<b>OH3060 H</b>	20,5
		380	208	<b>H3160</b>	29
		380	208	<b>OH3160 H</b>	29
		380	240	<b>H3260</b>	32
		380	240	<b>OH3260 H</b>	32
<b>300</b>	320	380	171	<b>H3064</b>	22
		380	171	<b>OH3064 H</b>	22
		400	226	<b>H3164</b>	32
		400	226	<b>OH3164 H</b>	32
		400	258	<b>H3264</b>	35
		400	258	<b>OH3264 H</b>	35
<b>320</b>	340	400	187	<b>H3068</b>	27
		400	187	<b>OH3068 H</b>	27
		440	254	<b>H3168</b>	50
		440	254	<b>OH3168 H</b>	50
		440	288	<b>H3268</b>	51,5
		440	288	<b>OH3268</b>	51,5
<b>340</b>	360	420	188	<b>H3072</b>	29
		420	188	<b>OH3072 H</b>	29
		460	259	<b>H3172</b>	56
		460	259	<b>OH3172 H</b>	56

## Adapter Sleeves



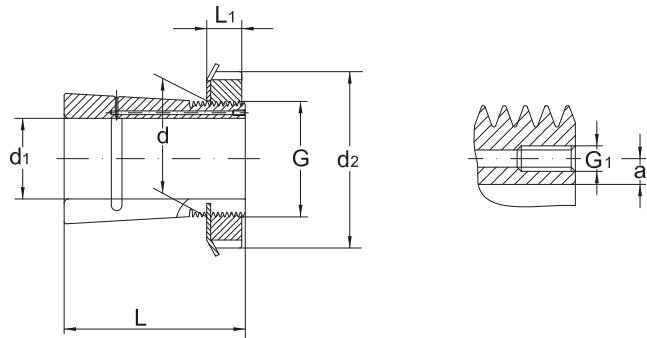
Shaft Ø	Thread	Dimensions					Lock nut	Locking Device
		$d_1$	$G$	$L_1$	$L_2$	$G_1$		
mm								
<b>260</b>	Tr 280 X 4	41	-	-	-	-	HM56 T	MB56
	Tr 280 X 4	41	-	-	M6	4,2	HM56 T	MB56
<b>280</b>	Tr 300 X 4	42	54	-	-	-	HM3060	MS3060
	Tr 300 X 4	42	54	M6	4,2	4,2	HM3060	MS3060
	Tr 300 X 4	40	53	-	-	-	HM3160	MS3160
	Tr 300 X 4	40	53	M6	4,2	4,2	HM3460	MS3460
	Tr 300 X 4	40	53	-	-	-	HM3160	MS3160
	Tr 300 X 4	40	53	M6	4,2	4,2	HM3160	MS3160
<b>300</b>	Tr 320 X 5	42	55	-	-	-	HM3064	MS3068-64
	Tr 320 X 5	42	55	M6	4	4	HM3064	MS3068-64
	Tr 320 X 5	42	56	-	-	-	HM3164	MS3164
	Tr 320 X 5	42	56	M6	4	4	HM3164	MS3164
	Tr 320 X 5	42	56	-	-	-	HM3164	MS3164
	Tr 320 X 5	42	56	M6	4	4	HM3164	MS3164
<b>320</b>	Tr 340 X 5	45	58	-	-	-	HM3068	MS3068-64
	Tr 340 X 5	45	58	M6	4	4	HM3068	MS3068-64
	Tr 340 X 5	55	72	-	-	-	HM3168	MS3172-68
	Tr 340 X 5	55	72	M6	4	4	HM3168	MS3172-68
	Tr 340 X 5	55	72	-	-	-	HM3168	MS3172-68
	Tr 340 X 5	55	72	M6	4	4	HM3168	MS3172-68
<b>340</b>	Tr 360 X 5	45	58	-	-	-	HM3072	MS3072
	Tr 360 X 5	45	58	M6	4	4	HM3072	MS3072
	Tr 360 X 5	58	75	-	-	-	HM3172	MS3172-68
	Tr 360 X 5	58	75	M6	4	4	HM3172	MS3172-68

## Adapter Sleeves



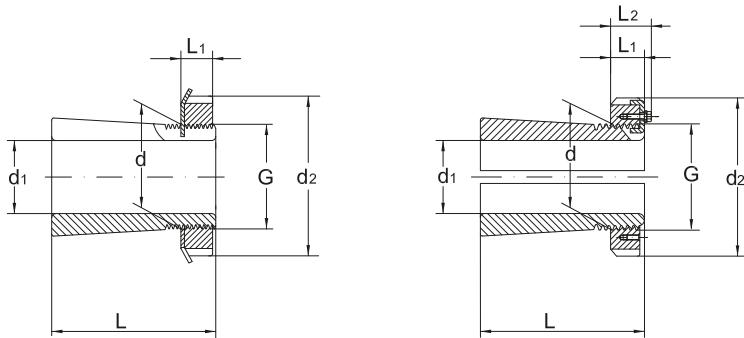
Shaft Ø mm	Dimension			Designation adapter sleeve, complete	Mass kg
	d <sub>1</sub>	d	d <sub>2</sub>		
<b>340</b>	360	460	299	<b>H3272</b>	60,5
		460	299	<b>OH3272 H</b>	60,5
<b>360</b>	380	450	193	<b>H3076</b>	35,5
		450	193	<b>OH3076 H</b>	35,5
		490	264	<b>H3176</b>	61,5
		490	264	<b>OH3176 H</b>	61,5
		490	310	<b>H3276</b>	69,5
		490	310	<b>OH3276 H</b>	69,5
<b>380</b>	400	470	210	<b>H3080</b>	40
		470	210	<b>OH3080 H</b>	40
		520	272	<b>H3180</b>	73
		520	272	<b>OH3180 H</b>	73
<b>400</b>	420	490	212	<b>H3084</b>	47
		490	212	<b>OH3084 H</b>	47
		540	304	<b>H3184</b>	80
		540	304	<b>OH3184 H</b>	80
<b>410</b>	440	520	228	<b>H3088</b>	65
		520	228	<b>OH3088 H</b>	65
		560	307	<b>H3188</b>	95
		560	307	<b>OH3188 H</b>	95
<b>430</b>	460	540	234	<b>H3092</b>	71
		540	234	<b>OH3092 H</b>	71

## Adapter Sleeves



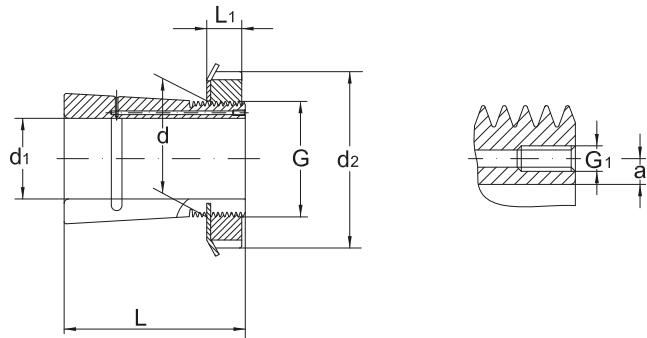
Shaft Ø	Thread	Dimensions					Lock nut	Locking Device
		$d_1$	$G$	$L_1$	$L_2$	$G_1$		
mm								
<b>340</b>	Tr 360 X 5	58	75	-	-	-	HM3172	MS3172-68
	Tr 360 X 5	58	75	-	-	10	HM3172	MS3172-68
<b>360</b>	Tr 380 X 5	48	62	-	-	-	HM3076	MS3080-76
	Tr 380 X 5	48	62	M6	4	4	HM3076	MS3080-76
	Tr 380 X 5	60	77	-	-	-	HM3176	MS3176
	Tr 380 X 5	60	77	M6	4	4	HM3176	MS3176
	Tr 380 X 5	60	77	-	-	-	HM3176	MS3176
	Tr 380 X 5	60	77	-	-	10,5	HM3176	MS3176
<b>380</b>	Tr 400 X 5	52	66	-	-	-	HM3080	MS3080-76
	Tr 400 X 5	52	66	M6	4	4	HM3080	MS3080-76
	Tr 400 X 5	62	82	-	-	-	HM3180	MS3184-80
	Tr 400 X 5	62	82	M6	4	4	HM3180	MS3184-80
<b>400</b>	Tr 420 X 5	52	66	-	-	-	HM3084	MS3084
	Tr 420 X 5	52	66	M6	4	4	HM3084	MS3084
	Tr 420 X 5	70	90	-	-	-	HM3184	MS3184-80
	Tr 420 X 5	70	90	M6	4	4	HM3184	MS3184-80
<b>410</b>	Tr 440 X 5	60	77	-	-	-	HM3088	MS3092-88
	Tr 440 X 5	60	77	M8	6,5	6,5	HM3088	MS3092-88
	Tr 440 X 5	70	90	-	-	-	HM3188	MS3192-88
	Tr 440 X 5	70	90	M8	6,5	6,5	HM3188	MS3192-88
<b>430</b>	Tr 460 X 5	60	77	-	-	-	HM3092	MS3092-88
	Tr 460 X 5	60	77	M8	6,5	6,5	HM3092	MS3092-88

## Adapter Sleeves



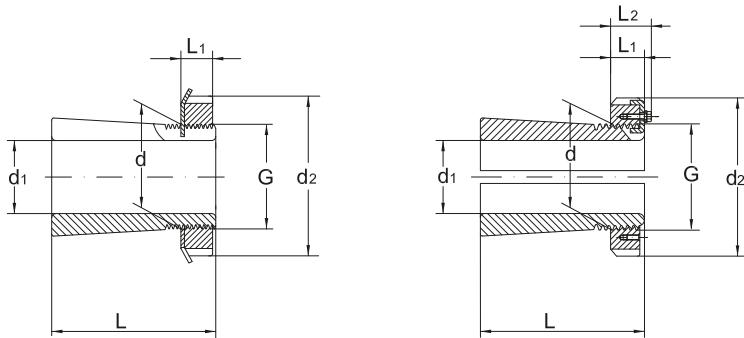
Shaft Ø d <sub>1</sub>	Dimension d	Dimension d <sub>2</sub>	Length L	Designation adapter sleeve, complete	Mass kg
mm	mm	mm	mm		
<b>430</b>	460	580	326	<b>H3192</b>	119
		580	326	<b>OH3192 H</b>	119
<b>450</b>	480	560	237	<b>H3096</b>	75
		560	237	<b>OH3096 H</b>	75
	620	620	335	<b>H3196</b>	135
		620	335	<b>OH3196 H</b>	135
<b>470</b>	500	580	247	<b>H30/500</b>	82
		580	247	<b>OH30/500 H</b>	82
	630	630	356	<b>H31/500</b>	145
		630	356	<b>OH31/500 H</b>	145
<b>500</b>	530	630	265	<b>H30/530</b>	105
		630	265	<b>OH30/530 H</b>	105
<b>530</b>	560	650	282	<b>H30/560</b>	112
		650	282	<b>OH30/560 H</b>	112
<b>560</b>	600	700	289	<b>H30/600</b>	147
		700	289	<b>OH30/600 H</b>	147
<b>600</b>	630	730	301	<b>H30/630</b>	138
		730	301	<b>OH30/630 H</b>	138
<b>630</b>	670	780	324	<b>H30/670</b>	190
		780	324	<b>OH30/670 H</b>	190
<b>670</b>	710	830	342	<b>H30/710</b>	228
		830	342	<b>OH30/710 H</b>	228

## Adapter Sleeves



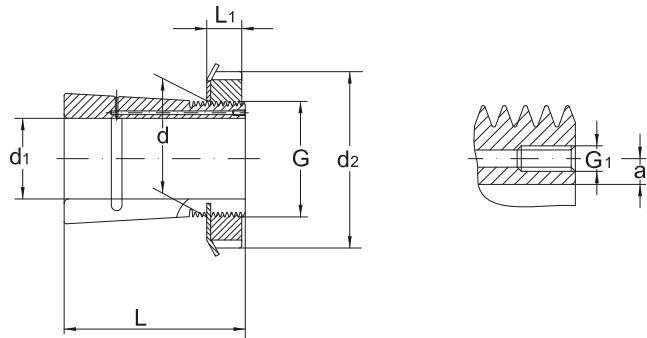
Shaft Ø	Thread	Dimensions					Lock nut	Locking Device
		d <sub>1</sub>	G	L <sub>1</sub>	L <sub>2</sub>	G <sub>1</sub>		
mm								
<b>430</b>	Tr 460 X 5	75	95	-	-	-	HM3192	MS3192-88
	Tr 460 X 5	75	95	M8	6,5	-	HM3192	MS3192-88
<b>450</b>	Tr 480 X 5	60	77	-	-	-	HM3096	MS30/500-96
	Tr 480 X 5	60	77	M8	6,5	-	HM3096	MS30/500-96
	Tr 480 X 5	75	95	-	-	-	HM3196	MS3196
	Tr 480 X 5	75	95	M8	6,5	-	HM3196	MS3196
<b>470</b>	Tr 500 X 5	68	85	-	-	-	HM30/500	MS30/500-96
	Tr 500 X 5	68	85	M8	6,5	-	HM30/500	MS30/500-96
	Tr 500 X 5	80	100	-	-	-	HM31/500	MS31/500
	Tr 500 X 5	80	100	M8	6,5	-	HM31/500	MS31/500
<b>500</b>	Tr 530 X 6	68	90	-	-	-	HM30/530	MS30/600-530
	Tr 530 X 6	68	90	M8	6	-	HM30/530	MS30/600-530
<b>530</b>	Tr 560 X 6	75	97	-	-	-	HM30/560	MS30/560
	Tr 560 X 6	75	97	M8	6	-	HM30/560	MS30/560
<b>560</b>	Tr 600 X 6	75	97	-	-	-	HM30/600	MS30/600-530
	Tr 600 X 6	75	97	-	8	-	HM30/600	MS30/600-530
<b>600</b>	Tr 630 X 6	75	97	-	-	-	HM30/630	MS30/630
	Tr 630 X 6	75	97	M8	6	-	HM30/630	MS30/630
<b>630</b>	Tr 670 X 6	80	102	-	-	-	HM30/670	MS30/670
	Tr 670 X 6	80	102	-	8	-	HM30/670	MS30/670
<b>670</b>	Tr 710 X 7	90	112	-	-	-	HM30/710	MS30/710
	Tr 710 X 7	90	112	-	8	-	HM30/710	MS30/710

## Adapter Sleeves



Shaft Ø d <sub>1</sub>	Dimension d	Dimension d <sub>2</sub>	Dimension L	Designation adapter sleeve, complete	Mass kg
mm	mm	mm	mm		
<b>710</b>	750	870	356	<b>H30/750</b>	246
		870	356	<b>OH30/750 H</b>	246
<b>750</b>	800	920	366	<b>H30/800</b>	302
		920	366	<b>OH30/800 H</b>	302
<b>800</b>	850	980	380	<b>H30/850</b>	341
		980	380	<b>OH30/850 H</b>	341

## Adapter Sleeves



Shaft Ø	Thread	Dimensions					Lock nut	Locking Device
		$d_1$	$G$	$L_1$	$L_2$	$G_1$		
mm								
<b>710</b>	Tr 750 X 7	90		112	-	-	HM30/750	MS30/800-750
	Tr 750 X 7	90		112	-	8	HM30/750	MS30/800-750
<b>750</b>	Tr 840 X 7	90		112	-	-	HM30/800	MS30/800-750
	Tr 800 X 7	90		112	-	10	HM30/800	MS30/800-750
<b>800</b>	Tr 850 X 7	90		115	-	-	HM30/850	MS30/900-850
	Tr 850 X 7	90		115	-	10	HM30/850	MS30/900-850



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URB

## Withdrawal Sleeves

### Standards, Boundary dimensions

Withdrawal Sleeves DIN 5416

#### General

**Withdrawal sleeves** (see sketch below) are slotted steel sleeves that have a tapered outer diameter on one side and a thread on the large diameter on the opposite side.

Standard withdrawal sleeves have tapered outers, taper **1:12** except for withdrawal sleeves of series **AH 240** and **AH 241** having tapers **1:30**.

**URB Withdrawal Sleeves** are supplied without lock nut as standard.

**URB Withdrawal Sleeves** are produced in two different designs as standard.

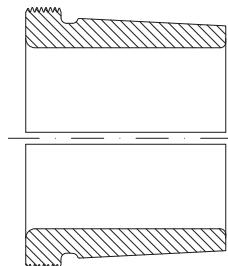
Beside the standard design (see figure **a**), larger withdrawal sleeves from bore diameter 200 mm onwards are also available with oil bores and oil distribution ducts as required for applying the oil injection method as shown in figure **b**.

**URB withdrawal sleeves** that are foreseen with facilities for an application of the oil injection method are designated "**AOH...**"

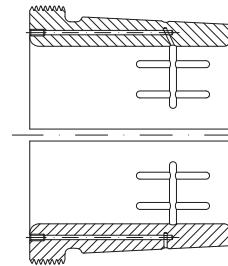
When withdrawal sleeves are used, the bearing inner ring must to be supported by an effective surface contact, such as a shaft shoulder, (see figure **a**).

Where larger radii bearing journals and shaft shoulders are necessary for strength reasons, (e.g. where such radii become larger than the bearing fillet), suitable distance rings must be applied.

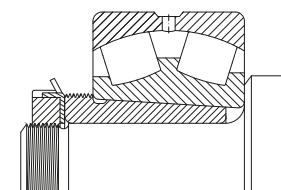
In each case the withdrawal sleeves must be secured against axial displacement loosening by means of lock nuts (see fig. **c**) or end plates (see fig. **d**).



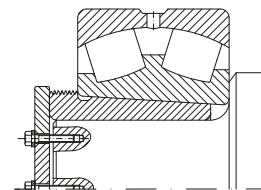
**a**



**b**

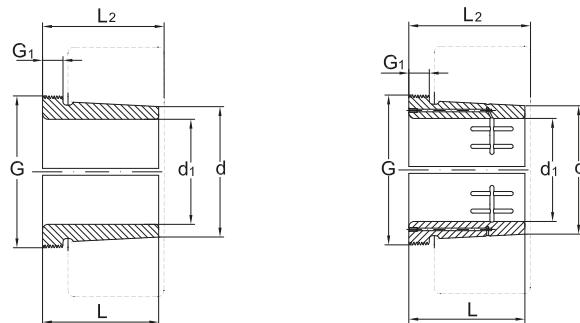


**c**



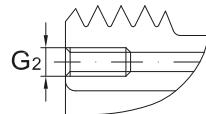
**d**

## Withdrawal Sleeves



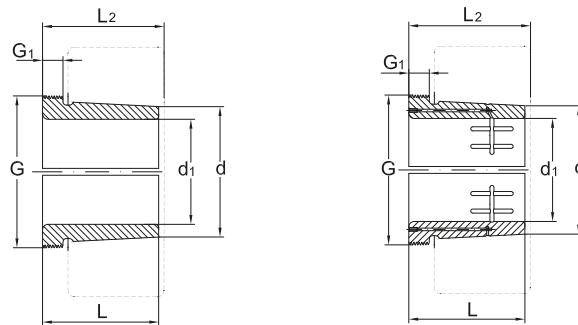
Shaft Ø		Dimension						Designation adapter sleeve, complete	Mass	Lock Nut
$d_1$	$d$	$G$	$G_1$	$G_2$	$L$	$L_1$			kg	
mm										
<b>35</b>	40	M 45 X 1,5	6	-	29	32	<b>AH308</b>	0,09	KM 9	
		M 45 X 1,5	7	-	40	43	<b>AH2308</b>	0,13	KM 9	
<b>40</b>	45	M 50 X 1,5	6	-	31	34	<b>AH309</b>	0,12	KM 10	
		M 50 X 1,5	7	-	44	47	<b>AH2309</b>	0,16	KM 10	
<b>45</b>	50	M 55 X 2	7	-	35	38	<b>AHX310</b>	0,13	KM 11	
		M 55 X 2	9	-	50	53	<b>AHX2310</b>	0,19	KM 11	
<b>50</b>	55	M 60 X 2	7	-	37	40	<b>AHX311</b>	0,16	KM 12	
		M 60 X 2	10	-	54	57	<b>AHX2311</b>	0,26	KM 12	
<b>55</b>	60	M 65 X 2	8	-	40	43	<b>AHX312</b>	0,19	KM 13	
		M 65 X 2	11	-	58	61	<b>AHX2312</b>	0,30	KM 13	
<b>60</b>	65	M 70 X 2	8	-	42	45	<b>AH313 G</b>	0,22	KM 14	
		M 75 X 2	12	-	61	64	<b>AH2313</b>	0,39	KM 15	
<b>65</b>	70	M 75 X 2	8	-	43	47	<b>AH314 G</b>	0,24	KM 15	
		M 80 X 2	12	-	64	68	<b>AHX2314</b>	0,45	KM 16	
<b>70</b>	75	M 80 X 2	8	-	45	49	<b>AH315 G</b>	0,29	KM 16	
	75	M 85 X 2	12	-	68	72	<b>AHX2315</b>	0,53	KM 17	
<b>75</b>	80	M 90 X 2	8	-	48	52	<b>AH316</b>	0,37	KM 18	
		M 90 X 2	12	-	71	75	<b>AHX2316</b>	0,57	KM 18	
<b>80</b>	85	M 95 X 2	9	-	52	56	<b>AHX317</b>	0,43	KM 19	

## Withdrawal Sleeves



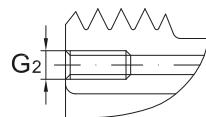
Shaft Ø		Dimension						Designation adapter sleeve, complete	Mass	Lock Nut
d <sub>1</sub>	d	G	G <sub>1</sub>	G <sub>2</sub>	L	L <sub>1</sub>		kg		
mm										
<b>80</b>	85	M 95 X 2	13	-	74	78	<b>AHX2317</b>	0,65	KM 19	
<b>85</b>	90	M 100 X 2	9	-	53	57	<b>AHX318</b>	0,46	KM 20	
		M 100 X 2	10	-	63	67	<b>AHX3218</b>	0,57	KM 20	
		M 100 X 2	14	-	79	83	<b>AHX2318</b>	0,76	KM 20	
<b>90</b>	95	M 105 X 2	10	-	57	61	<b>AHX319</b>	0,54	KM 21	
		M 105 X 2	16	-	57	61	<b>AHX2319</b>	0,90	KM 21	
<b>95</b>	100	M 110 X 2	10	-	59	63	<b>AHX320</b>	0,58	KM 22	
		M 110 X 2	11	-	64	68	<b>AHX3120</b>	0,66	KM 22	
		M 110 X 2	11	-	73	77	<b>AHX3220</b>	0,76	KM 22	
		M 110 X 2	16	-	90	94	<b>AHX2320</b>	1,00	KM 22	
<b>105</b>	110	M 120 X 2	11	-	68	72	<b>AHX3122</b>	0,76	KM 24	
		M 125 X 2	11	-	82	86	<b>AHX3222</b>	1,05	KM 25	
		M 125 X 2	16	-	98	102	<b>AHX2322</b>	1,35	KM 25	
		M 115 X 2	13	-	82	91	<b>AH24122</b>	0,71	KM 23	
<b>115</b>	120	M 130 X 2	13	-	60	64	<b>AHX3024</b>	0,73	KM 26	
		M 130 X 2	12	-	75	79	<b>AHX3124</b>	0,94	KM 26	
		M 135 X 2	13	-	90	94	<b>AHX3224</b>	1,30	KM 27	
		M 135 X 2	17	-	105	109	<b>AHX2324</b>	1,65	KM 27	
		M 125 X 2	13	-	73	82	<b>AH24024</b>	0,70	KM 25	

## Withdrawal Sleeves



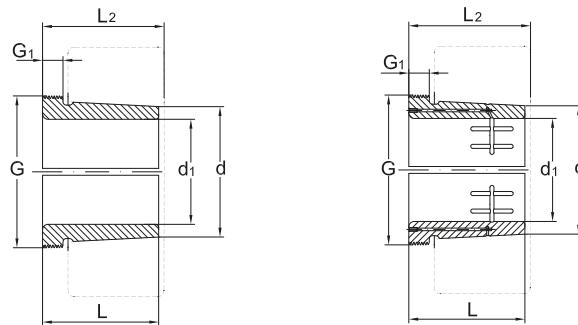
Shaft Ø		Dimension						Designation adapter sleeve, complete	Mass	Lock Nut
d <sub>1</sub>	d	G	G <sub>1</sub>	G <sub>2</sub>	L	L <sub>1</sub>		kg		
115	120	M 130 X 2	13	-	93	102	AH24124	1,00	KM 26	
125	130	M 140 X 2	14	-	67	71	AHX3026	0,91	KM 28	
		M 140 X 2	12	-	78	82	AHX3126	1,10	KM 28	
		M 145 X 2	15	-	98	102	AHX3226	1,55	KM 29	
		M 145 X 2	19	-	115	119	AHX2326	2,00	KM 29	
		M 135 X 2	14	-	83	93	AH24026	0,88	KM 27	
		M 140 X 2	14	-	94	104	AH24126	1,15	KM 28	
135	140	M 150 X 2	14	-	68	73	AHX3028	1,00	KM 30	
		M 150 X 2	14	-	83	88	AHX3128	1,30	KM 30	
		M 155 X 3	15	-	104	109	AHX3228	1,85	KM 31	
		M 155 X 3	20	-	125	130	AHX2328	2,35	KM 31	
		M 145 X 2	14	-	83	93	AH24028	0,95	KM 29	
		M 150 X 2	14	-	99	109	AH24128	1,30	KM 30	
145	150	M 160 X 3	15	-	72	77	AHX3030	1,15	KM 32	
		M 165 X 3	15	-	96	101	AHX3130	1,80	KM 33	
		M 165 X 3	17	-	114	119	AHX3230	2,20	KM 33	
		M 165 X 3	24	-	135	140	AHX2330	2,80	KM 33	
		M 155 X 3	15	-	90	101	AH24030	1,05	KM 31	
		M 160 X 3	15	-	115	126	AH24130	1,55	KM 32	
150	160	M 170 X 3	16	-	77	82	AH3032	2,05	KM 34	

## Withdrawal Sleeves



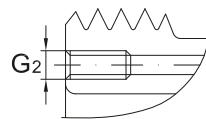
Shaft Ø		Dimension						Designation adapter sleeve, complete	Mass	Lock Nut
d <sub>1</sub>	d	G	G <sub>1</sub>	G <sub>2</sub>	L	L <sub>1</sub>		kg		
mm										
150	160	M 180 X 3	16	-	103	108	AH3132	3,20	KM 36	
		M 180 X 3	20	-	124	130	AH3232	4,00	KM 36	
		M 180 X 3	24	-	140	146	AH2332	4,65	KM 36	
		M 170 X 3	15	-	95	106	AH24032	2,30	KM 34	
		M 170 X 3	15	-	124	135	AH24132	3,05	KM 34	
160	170	M 180 X 3	17	-	85	90	AH3034	2,40	KM 36	
		M 190 X 3	16	-	104	109	AH3134	3,45	KM 38	
		M 190 X 3	24	-	134	140	AH3234	4,80	KM 38	
		M 190 X 3	24	-	146	152	AH2334	5,25	KM 38	
		M 180 X 3	16	-	106	117	AH24034	2,70	KM 36	
		M 180 X 3	16	-	125	136	AH24134	3,25	KM 36	
170	180	M 190 X 3	17	-	92	98	AH3036	2,80	KM 38	
		M 200 X 3	17	-	105	110	AH2236	3,75	KM 40	
		M 200 X 3	19	-	116	122	AH3136	4,25	KM 40	
		M 200 X 3	24	-	140	146	AH3236	5,25	KM 40	
		M 200 X 3	26	-	154	160	AH2336	6,05	KM 40	
		M 190 X 3	16	-	116	127	AH24036	3,20	KM 38	
		M 190 X 3	16	-	134	145	AH24136	3,75	KM 38	
180	190	Tr 205 X 4	18	-	96	102	AH3238	3,40	HML 41 T	
		Tr 210 X 4	18	-	112	117	AH2238	4,25	HM 42 T	
		Tr 210 X 4	20	-	125	131	AH3138	4,90	HM 42 T	

## Withdrawal Sleeves



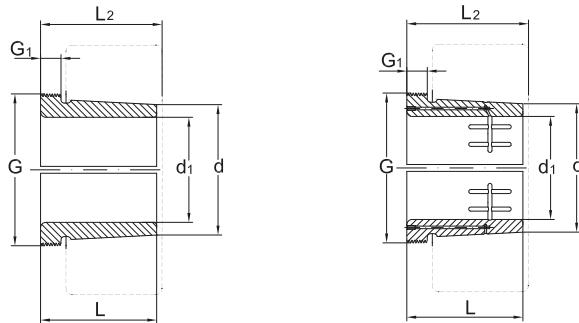
Shaft Ø		Dimension						Designation adapter sleeve, complete	Mass	Lock Nut
d <sub>1</sub>	d	G	G <sub>1</sub>	G <sub>2</sub>	L	L <sub>1</sub>		kg		
<b>180</b>	190	Tr 210 X 4	25	-	145	152	<b>AH3238</b>	5,90	HM 42 T	
		Tr 210 X 4	26	-	160	167	<b>AH2338</b>	6,70	HM 42 T	
		M 200 X 3	18	-	118	131	<b>AH24038</b>	3,55	KM 40	
		M 200 X 3	18	-	146	159	<b>AH24138</b>	4,45	KM 40	
<b>190</b>	200	Tr 215 X 4	19	-	102	108	<b>AH3040</b>	3,85	HML 43 T	
		Tr 220 X 4	19	-	118	123	<b>AH2240</b>	4,70	HM 44 T	
		Tr 220 X 4	21	-	134	140	<b>AH3140</b>	5,65	HM 44 T	
		Tr 220 X 4	25	-	153	160	<b>AH3240</b>	6,60	HM 44 T	
		Tr 220 X 4	30	-	170	177	<b>AH2340</b>	7,60	HM 44 T	
		Tr 210 X 4	18	-	127	140	<b>AH24040</b>	4,00	HM 42 T	
		Tr 210 X 4	18	-	158	171	<b>AH24140</b>	5,05	HM 42 T	
<b>200</b>	220	Tr 235 X 4	20	G 1/8	111	117	<b>AH3044</b>	7,40	HML 47 T	
		Tr 240 X 4	23	G 1/4	145	115	<b>AH3144</b>	9,30	HM 48 T	
		Tr 240 X 4	30	G 1/4	181	189	<b>AH2344</b>	13,5	HM 48 T	
		Tr 230 X 4	20	G 1/8	138	152	<b>AH24044</b>	8,20	HM 46 T	
		Tr 230 X 4	20	G 1/8	170	184	<b>AH24144</b>	10,0	HM 46 T	
<b>220</b>	240	Tr 260 X 4	21	G 1/4	116	123	<b>AH3048</b>	7,95	HM 3052	
		Tr 260 X 4	25	G 1/4	154	161	<b>AH3148</b>	12,0	HM 52 T	
		Tr 260 X 4	30	G 1/4	189	197	<b>AH2348</b>	14,0	HM 52 T	
		Tr 250 X 4	20	G 1/8	138	153	<b>AOH24048</b>	8,05	HM 50 T	

## Withdrawal Sleeves



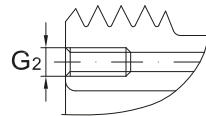
Shaft Ø		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d <sub>1</sub>	d	G	G <sub>1</sub>	G <sub>2</sub>	L	L <sub>1</sub>		kg	
220	240	Tr 260 X 4	20	G 1/4	180	195	<b>AOH24148</b>	11,5	HM 52 T
240	260	Tr 280 X 4	23	G 1/4	128	135	<b>AOH3052</b>	9,60	HM 3056
		Tr 290 X 4	23	G 1/4	155	161	<b>AOH2252</b>	12,5	HM 58 T
		Tr 290 X 4	26	G 1/4	172	179	<b>AOH3152</b>	16,0	HM 58 T
		Tr 290 X 4	30	G 1/4	205	213	<b>AOH2352</b>	17,5	HM 58 T
		Tr 270 X 4	22	G 1/8	162	178	<b>AOH24052</b>	10,5	HM 54 T
		Tr 280 X 4	22	G 1/4	202	218	<b>AOH24152</b>	14,0	HM 56 T
260	280	Tr 300 X 4	24	G 1/4	131	139	<b>AOH3056</b>	11,0	HM 3060
		Tr 310 X 5	28	G 1/4	175	183	<b>AOH3156</b>	15,5	HM 62 T
		Tr 310 X 5	30	G 1/4	212	220	<b>AOH2356</b>	19,5	HM 62 T
		Tr 290 X 4	22	G 1/8	162	179	<b>AOH24056</b>	11,5	HM 58 T
		Tr 300 X 4	22	G 1/4	202	219	<b>AOH24156</b>	15,0	HM 3160
280	300	Tr 320 X 5	26	G 1/4	145	153	<b>AOH3060</b>	13,0	HM 3064
		Tr 330 X 5	30	G 1/4	192	200	<b>AOH3160</b>	19,0	HM 66 T
		Tr 330 X 5	34	G 1/4	228	236	<b>AOH3260</b>	23,5	HM 66 T
		Tr 310 X 5	24	G 1/8	184	202	<b>AOH24060</b>	14,0	HM 62 T
		Tr 320 X 5	24	G 1/4	224	242	<b>AOH24160</b>	18,5	HM 3164
300	320	Tr 345 X 5	27	G 1/4	149	157	<b>AOH3064</b>	14,5	HM 69 T
		Tr 350 X 5	31	G 1/4	209	217	<b>AOH3164</b>	22,5	HM 70 T
		Tr 350 X 5	36	G 1/4	246	254	<b>AOH3264</b>	27,5	HM 70 T
		Tr 330 X 5	24	G 1/8	184	202	<b>AOH24064</b>	15,0	HM 66 T

## Withdrawal Sleeves



Shaft Ø		Dimension						Designation adapter sleeve, complete	Mass	Lock Nut
$d_1$	$d$	$G$	$G_1$	$G_2$	$L$	$L_1$		kg		
300	320	Tr 340 X 5	24	G 1/4	242	260	<b>AOH24164</b>	20,5	HM 3168	
320	340	Tr 365 X 5	28	G 1/4	162	171	<b>AOH3068</b>	17,5	HML 73 T	
		Tr 370 X 5	33	G 1/4	225	234	<b>AOH3168</b>	26,5	HM 74 T	
		Tr 370 X 5	38	G 1/4	264	273	<b>AOH3268</b>	32,0	HM 74 T	
		Tr 360 X 5	26	G 1/4	206	225	<b>AOH24068</b>	18,0	HM 3072	
		Tr 360 X 5	26	G 1/4	269	288	<b>AOH24168</b>	25,5	HM 3172	
340	360	Tr 385 X 5	30	G 1/4	167	176	<b>AOH3072</b>	19,0	HML 77 T	
		Tr 400 X 5	35	G 1/4	229	238	<b>AOH3172</b>	30,0	HM 3180	
		Tr 400 X 5	40	G 1/4	274	283	<b>AOH3272</b>	33,0	HM 3180	
		Tr 380 X 5	26	G 1/4	206	226	<b>AOH24072</b>	20,0	HM 3076	
		Tr 380 X 5	26	G 1/4	269	289	<b>AOH24172</b>	26,0	HM 3176	
360	380	Tr 410 X 5	31	G 1/4	170	180	<b>AOH3076</b>	23,5	HML 82 T	
		Tr 420 X 5	36	G 1/4	232	242	<b>AOH3176</b>	38,0	HM 3184	
		Tr 420 X 5	42	G 1/4	284	294	<b>AOH3276</b>	45,5	HM 3184	
		Tr 400 X 5	28	G 1/4	208	228	<b>AOH24076</b>	23,5	HM 3080	
		Tr 400 X 5	28	G 1/4	271	291	<b>AOH24176</b>	31,0	HM 3180	
380	400	Tr 430 X 5	33	G 1/4	183	193	<b>AOH3080</b>	27,0	HML 86 T	
		Tr 440 X 5	38	G 1/4	240	250	<b>AOH3180</b>	39,5	HM 3188	
		Tr 440 X 5	44	G 1/4	302	312	<b>AOH3280</b>	51,5	HM 3188	

## Withdrawal Sleeves



Shaft Ø		Dimension					Designation adapter sleeve, complete	Mass	Lock Nut
d <sub>1</sub>	d	G	G <sub>1</sub>	G <sub>2</sub>	L	L <sub>1</sub>		kg	
mm								kg	
<b>380</b>	400	Tr 420 X 5	28	G 1/4	228	248	<b>AOH24080</b>	27,0	HM 3084
		Tr 420 X 5	28	G 1/4	278	298	<b>AOH24180</b>	35,0	HM 3184
<b>400</b>	420	Tr 450 X 5	34	G 1/4	186	196	<b>AOH3084</b>	29,0	HML 90 T
		Tr 460 X 5	40	G 1/4	266	276	<b>AOH3184</b>	46,0	HM 3192
		Tr 440 X 5	30	G 1/4	230	252	<b>AOH24084</b>	29,0	HM 3088
		Tr 440 X 5	30	G 1/4	310	332	<b>AOH24184</b>	39,0	HM 3188
<b>420</b>	440	Tr 460 X 5	30	G 1/4	242	264	<b>AOH24088</b>	32,0	HML 92 T
		Tr 460 X 5	30	G 1/4	310	332	<b>AOH24188</b>	45,5	HM 3192
<b>440</b>	460	Tr 480 X 5	32	G 1/4	332	355	<b>AOH24192</b>	50,0	HM 3196
<b>460</b>	480	Tr 500 X 5	32	G 1/4	340	363	<b>AOH24196</b>	51,5	HM 31/500
<b>480</b>	500	Tr 530 X 6	35	G 1/4	360	383	<b>AOH241/500</b>	57,0	HM 31/530
<b>500</b>	530	Tr 550 X 6	35	G 1/4	370	394	<b>AOH241/530</b>	86,0	HM 110 T
<b>530</b>	560	Tr 580 X 6	38	G 1/4	393	417	<b>AOH241/560</b>	97,0	HM 116 T
<b>560</b>	600	Tr 630 X 6	38	G 1/4	413	439	<b>AOH241/600</b>	120	HM 126 T
<b>600</b>	630	Tr 650 X 6	40	G 1/4	440	466	<b>AOH241/630</b>	130	HM 130 T

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